THE AMERICAN INDIAN AND MENTAL TESTS

by

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A. B. University of Kansas, 1924

Submitted to the Department of PHILOSOPHY and PSYCHOLOGY and the Faculty of the GRADUATE SCHOOL of the UNIVERSITY OF KANSAS in partial fulfillment of the requirements for the degree of Master of Arts.

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July, 1925.

CONTENTS

I INTRODUCTION

The investigation reported in this thesis was made at the University of Kansas during the years 1924 and 1925. The work was suggested by and done under the direction of Dr. Curt Rosenow to whom I am very grateful both for the advice and helpful criticism given during the experimental work and for the assistance he gave me in the preparation of this thesis. The writer acknowledges the courtesies shown by Superintendent H. B. Pearis of Haskell Institute, and Superintendents H. P. Smith and M. C. Del Manzo, both of the Lawrence Public Schools, in affording her the privilege of giving the tests to students in their respective schools.

In the present study the experimenter set out to determine the relation of the alleged language handicap of the American Indian to his performance in the individual tests of the Stanford-Binet scale, and later, of the National scale of intelligence tests.

Investigators in the field of racial Psychology frequently point to a language handicap of persons of non-English speaking parentage as being the essential factor in producing their relatively inferior scores in English tests of a verbal type.*

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* Linguistic or verbal tests are used here to mean tests which are presented in words.

Administrators and teachers in the Indian schools concede that the American Indian has a language difficulty. Superintendent H. B. Peairs of Haskell Institute says that some tribes encounter greater difficulties in their use of the English language than do others: "The Oneidas learn the English language with great difficulty." Mrs. F. C. Wenrick, teacher of English in the Haskell Institute, reports that the Arapho Indians probably have the most difficulty in learning the grammatical forms of the English language.

The data obtained by using both the Stanford-Binet intelligence test and the National test, Scale A furnished no clear cut evidence that the alleged language handicap of the Indian was the essential factor in producing Indian inferiority (Indians versus Whites) at certain ones of the individual tests. These data will be presented in a later section of this thesis. The experimenter, therefore, next attempted to demonstrate the possibility of improving the Indians' relative scores at tests of a linguistic nature by presenting more typically Indian situations than either the Stanford-Binet or the National intelligence tests offer.

This investigation does not purport to present a complete analysis of the factors which enter in to cause Indian inferiority in certain English verbal tests. It can merely serve to further our knowledge of the problem.

II HISTORICAL

The investigations that have been made, both in Europe and in the United States, upon the problem of the effects of a language difficulty upon the scores of the tested subjects belonging to a racial group whose native language is different from that in which the tests were standardized, represent work among a number of racial groups. This thesis deals mainly with one phase of this racial problem: the effects of the alleged language handicap of the American Indians upon their scores in the intelligence tests, which were standardized on American Whites. Accordingly, the history of the problem will be treated under the following two heads: (1) linguistic studies on racial groups other than the American Indian, and (2) investigations on the American Indian.

A. LINGUISTIC STUDIES ON RACIAL GROUPS OTHER THAN THE AMERICAN INDIAN.

Laurie (19) concludes from his observations as an educator in Wales, in 1890, "that if it were possible for a child to live in two languages at once equally well, so much the worse. His intellectual and spiritual growth would have great difficulty in asserting itself under such circumstances." (p.79)

Williams (36) says that he has a firm belief "that early bilinguals like the Welsh whose education is carried on in two languages must get more from their work than do the scholars of a country like England where only one language is used."

Young (38) concludes from studies made in 1911 among certain immigrant groups "that the correlation of intelligence ratings with teachers' estimates and school work generally run higher for a verbal than for a non-verbal test. But we should not forget that a teacher's estimate of a child's intelligence will unquestionably be influenced by the child's ability to use the English language, and of course all the child's school work is conditioned by his ability to understand and make use of English."

Sapir (30) reports at a meeting of the American Association of Anthropologists in 1911 "that a vocabulary should to a great degree reflect cultural complexity is practically self evident, for a vocabulary, that is, the subject matter of a language, aims at any given time to serve as a set of symbols referring to the cultural background of the group." (p. 233)

Yerkes (37) concludes from his data relating to the racial status of children tested previous to 1915 with his Point Scale revision of the Binet tests "that factors which are in part describable as sociological are correlated with differences in intellectual performance which, may amount to as much as 30% of

the total." He does not specify whether or not a language factor might make up a part of this 30%.

Yerkes (20) concludes from extensive trials of the Army Beta test after its appearance in 1918 that "there are indications to the effect that individuals handicapped by language difficulty and illiteracy are penalized to an appreciable degree in Beta as compared with men not so handicapped, although this is far less true for Beta than for Alpha."

Whipple (35) reports that 94% of the students tested at the University of Michigan received in the Army Alpha grades of B or better, and "of the remaining 6% several were students of foreign extraction whose low scores must have been in a considerable measure produced by a lack of ready command of English." (p.266)

Terman (33) says in 1919 "that a limited acquaintance with the language employed in the examination does not put the subject to great disadvantage." (p.14)

Pintner and Keller (23) in 1919 and 1920 investigated the relation of the language handicap of 674 non-English speaking foreign children to the Binet intelligence test. They conclude that children who hear a foreign language at home, test lower as a rule when given the revisions of the Binet test - Stanford revision and the Yorkstown, Ohio Children's Service Bureau revision - than when given tests which require a minimum knowledge of English i.e. Pintner's Non-language Test, Pintner's Cube Test, Witmer's

Cylinders Test, Healy Construction Puzzle A and the Mare and Foal Test. And "that when classified according to mental age, those children who hear a foreign language at home may suffer a serious handicap when tested only by the revisions of the Binet Test." (p.220)

Smith (31) made a careful study of children below the age of eleven years in four schools in Wales. The children were under observation for a period of two years beginning in 1920. He found that for these four independent groups their power of free composition, choice of vocabulary and accuracy of thought developed at a different rate according as they were monoglot or bilingual. The superiority in each case was with the monoglot. He concludes: "so far from bilingualism being an 'intellectual advantage' it seems to be exactly the reverse." (p.281)

Colvin (6) found that scores (Otis tests) made by 1877 children in the schools of Brookline, Massachusetts, in 1920 indicated an average mental age 1 year in advance of the Otis norms, while an equal number of children of equal C. A. in the elementary schools of Cincinnati, Ohio, scored an average mental age 1 year below the Otis norms. In the arithmetic test, largely non-verbal in character, the scores made by the Cincinnati children were not inferior to those made by the Brookline children. Colvin interprets these results to mean "that differences in opportunities to learn words and acquire skill in their use might cause the

difference in total scores and more particularly in the verbal tests. Judging from the similarity in performance at the Arithmetic test alone the results seem to indicate further that the intelligence scores of the Brookline children gave them too high a mental rating." (p. 12)

In 1921 Colvin concludes from his study of 2,588 children at the Otis group intelligence test, scales A and B, "that the Otis tests are primarily literary tests; they are based on a knowledge of words. They put a premium on linguistic ability and make it possible for pupils who have had superior training in this respect, other things being equal, to obtain higher scores." (p.8).

Berry (3) made a classification of the intelligence of 10,000 First Grade children in 1921. He used the Detroit First Grade test, which requires no knowledge of written English. The correlation between this test and the Stanford-Binet Test is .69 based upon 100 unselected cases. One-half of the 10,000 children were in B I grade and were of foreign parentage on the father's side. Italian, Polish, Russian, and German children were represented among the foreign groups. One third of the foreign children came from homes where a foreign language was spoken.

His data shows that the pupils from homes where English was spoken test higher than those from homes where a foreign

language was spoken. Of the pupils from non-English speaking homes, the Germans tested highest and the Italians tested lowest. Berry concludes "that language difficulty accounts for most of the marked differences in intelligence rating. The difference between the intelligence rating of the English-speaking Germans and the English-speaking Italians may mean that the Italians acquire English with greater difficulty than do Germans or that they have not been in this country as long." (p.202)

Burt (5) who gave the Binet-Simon tests to London school children concludes that various factors effected the results. In 1921 he wrote: "Sex influences them but little; social status rather more; educational and particularily linguistic attainments more profoundly than any one other factor measurable with exactitude. In diagnostic value the single tests differ vastly. Many are scholastic and most are linguistic." (p.208)

Barrows (2) in a discussion of the "Foreign Child and His Speech Handicap", in 1922, reports that there should be no attempt to prevent the child's speaking a foreign language; to be bilingual is a distinct advantage. But "the first and most important task of the American kindergarten in a foreign community is to teacht the child who hears a non-English language at home in such a way that he will feel that English is his mother tongue and that his Mother's tongue is the foreign language." (p.370)

Colvin (7) examined the psychological test records at Brown University in 1922 and found that of the 95 men who received low grades in their combined psychological tests only 8 had done good work. Two of these eight suffered from a language handicap. Further investigations revealed at least 10 men in Brown University who had received scores decidedly lower than their real mental ability because of language deficiencies. The most conspicious of language deficiencies have been found among American born students of Italian parentage. They "have a limited English vocabulary and tend to think slowly in English." (p.18)

Colvin (7), 1923, in discussing the possibility of framing intelligence tests that do not depend to a certain degree on linguistic knowledge and ability says, "It does not seem to follow necessarily when a test is employed in which no words are used that for this reason linguistic ability is not brought into play, particularily when rational processes are involved. The writer (C.) constantly catches himself when working with non-verbal tests using inner speech which becomes more and more conscious, when a problem increases in difficulty and complexity. This seems to mean that we cannot think to any extent without the use of words, hence we can never hope to frame intelligence tests that do not depend to a certain degree upon linguistic knowledge and ability." (p.11)

Root and Giardini (25), both of the University of

Pennsylvania, gave the Detroit First Grade test to 340 children of first and one-half second generation Italian parentage in 1922. The tests were given in the English language to the one-half second generation Italians all of whom spoke English at home. The Italian speaking children were arbitrarily divided into three groups. To one group the tests were administered in English, to another in Italian and to the third group in both English and Italian. The investigators find that the Italians who speak Italian at home achieve slightly better scores when tests are given in Italian or in Italian and English than when they are given in English alone and especially in tests of a strictly language character as the memories and the directions tests. They interpret these results to mean "that language is a factor in rating the intelligence of foreign children." But when these test scores were converted into I.Q.'s by an arbitrarily chosen method, the resultant I.Q.'s tend to show that language difficulty is not a factor in ratings of intelligence.

They also report that the I.Q. distribution of the second generation English-speaking Italian children is slightly superior to the first generation English-speaking Italian children in spite of the fact that these latter were given the tests in English or Italian or both. The authors interpret these results to mean "that the ability to perform is influenced by factors other than the simple factor of language. The inferior performances of

the first generation born in this country may be due to either imperfect habit formation in both or either language or to the fact that it may require two generations or more to make certain cultural adaptations to an environment, which if not superior, is at least more typically American." (p.172)

Pintner (24) gave the National Intelligence Test Scale A, Form 1, and the Pintner non-language test to the children in the third and fourth grades in a New York City school in 1922. Both of these tests were given to 121 American children (largely of Irish descent) and to 165 foreign children. The distribution curves for both tests show much the same type of distribution with no zero scores and no perfect scores. All scores were converted into M.A.

On the average there was no difference between the foreign group as a whole and the American group at the non-language test. The difference between foreign and American group at the National test is quite marked. Only 37% of the former reached the median of the American group. Taking the foreign groups separately only the Italian group, consisting of 102 persons, fell below the American on both Non-language and National Tests. Forty-three percent of the Italians reached or exceeded the median M. A. on the Non-language test while 36% of them reached or exceeded the median M. A. of the American group at the National test. Pintner points

out "that the verbal tests such as the National probably generally tends to over-emphasize greatly the intelligence difference between Italians and Americans." (p.295)

He says, "It is inconceivable that children living in an English-speaking environment, hearing, speaking, reading nothing but English should not have a distinct advantage in tests requiring the finding of opposites of words, hunting for an appropriate analogy, filling in of an incomplete sentence as compared with children who hear a foreign language at home and in many cases are required to communicate in a foreign language to some persons in their environment. Such contrasting groups are very far from having equal previous practice on the elements which go to make up the usual verbal test." (p. 295)

Phillips (22) in 1922 says "that of all the intelligence tests yet published, 75% of the questions depend more on experience, on associations and on general and specific education of the individual than on native intelligence. Of the 41 children found in California having a superior I. Q. all save one belonged to families of culture and intelligence, and of which one or both parents were college graduates. Association in environments, not native intelligence, qualified them to answer." (p.61)

Saer (28) made a careful investigation of bilingual and monoglot children in Welsh rural and urban areas in 1920 and

1921. Using the Stanford-Binet scale, as well as the tests which appeared in the Binet scale of 1911 and Burt's English version of Binet's scale, which were omitted from the Stanford scale, Saer examined individually 776 children all under twelve years of age and found a "clear superiority" of monoglot over bilingual children in rural districts. In urban districts he regards the disturbing effects of bilingualism on the growth of intelligence, as tested by the Binet scale, as "not significant", but suggests that there is evidence, even in urban areas, of "mental confusion".

By the use of a carefully selected list of one hundred Welsh words and the first list of one hundred Stanford test-English words he found that for these same children "the mean range of vocabulary of monoglot children in English was higher than that of bilingual children either in English or Welsh. The differences that Saer has shown to exist between monoglot and bilingual children he traces entirely to "the use of two languages before the power of using one language effectively has been acquired. The greatest influence on mental confusion occuring in bilingualism is exerted by the language used by bilingual children in their play and in their free association with youthful companions when that language is not also that in which they are first taught at school." (p.272)

Saer (29), in 1923, reports the results of testing 488 university students from both rural and urban areas in Wales.

He used an English verbal intelligence test, which he devised and had previously found to be "valid as a test of intelligence." The bilinguists were given the option of answering the questions either in Welsh or in English. He found a superiority of the Monoglot over the bilingual student coming from rural districts in Wales, while the difference between these linguistic groups from urban and industrial districts was inconsiderable. The monoglot of both the rural and urban districts showed equal ability at this test, while the urban bilinguist was superior to the rural bilinguist. Saer points out "that this difference between the monoglot and bilinguist from the rural districts appears to be of a permanent nature since it was found in rural children between seven and twelve years old and was found to persist in students throughout their university years." (p.42)

Brigham (4), in 1923, concludes from his study of the intelligence of the foreign born white draft that the superiority of the Nordic group of immigrants over both the Alpine and the Mediterranean groups is a genuine difference apart from a language factor. He points out that even though the Nordic group contains more English-speaking persons than does either one of the other two groups, when all English-speaking Nordics were discarded from the comparison "tremendous differences were still found between the non-English speaking Nordics and both the Alpine and

Mediterranean groups, a fact which clearly indicates that the underlying cause of the nativity differences that we have shown is race and not language." (p.180)

Symonds (32), in 1923, investigated the influence that attendance at a school conducted in an Oriental language has on the acquisition of and ability to use the English language. He concludes "that the Chinese language school, to which the Chinese children went a part of each school day works to prevent the growth of the English vocabulary by requiring expression and thinking in Chinese a part of the time." (p. 418) He refers to the effect of the poor English used in their homes thus: "I estimate that the influence of the home and playground is about four times as great as the Chinese language school in causing retardation in the English language." (p.421)

Darsie (8) found in 1924 that Japanese immigrant children tested with the Stanford-Binet test were most superior in the Paper Cutting, Code and Enclosed Boxes tests. He concludes that "most probably the Japanese superiority in visual perception and capacity for sustained attention is a real racial difference." He found the American children superior in tests involving memory and abstract thinking based upon meanings and concepts in verbal symbols of the English language.

Walters (34) investigated the effect of the language handicap of 100 American born children of Bohemian, German and

Italian parentage upon the Stanford-Binet tests. He concludes "that there is a language handicap of from six to eight months of mental age on the tests for children 13 years old coming from foreign-language-speaking homes." (p. 119)

B. INVESTIGATIONS ON THE AMERICAN INDIAN

Rowe (26) tested 547 white and 268 Indian children by the 1911 edition of the Binet-Simon intelligence test in 1914. His data show "that the Indians are relatively weaker in tests involving comprehension and definition than in tests of a more purely perceptual or memory nature. The Indians are everywhere inferior to the Whites."

Garth (10), in 1920, investigated the relative mental fatigability of Indians, Whites, and negroes at work in simple addition. He found "a tendency for Indians to fall away or 'fatigue' less than either the white or negro groups who worked at the same task. This held true for both older and younger groups in each of the races compared." (p. 245)

(16) In 1922, Garth found that sedentary Indians (Pueblos) do not acknowledge fatigue feelings as freely as do nomadic Indians (Navaho, Apache and the South East Indians), although the former fatigue more at a task in simple arithmetic.

The results of the above two investigations might throw

some light on future investigations of Indian tribal differences at intelligence tests - differences which now are being explained in terms of temperament, social status and linguistics.

Hunter (18) reports in 1922 that 715 American Indians showed "a positive correlation between increasing degree of white blood in the American Indian and score on the Otis intelligence test which would seem to indicate a racial difference, probably of intelligence although possibly of temperament." (p.276)

Of the ten tests comprising the Otis Scale, test 4 (interpretation of proberbs), 5 (arithmetic), and 6 (directions test using geometrical designs) were most difficult for the Indians, ages 14-18 years. Tests 4 and 6 were also the more difficult for the whites (all 15 years old). The three tests most difficult for the 4/4 and 3/4 bloods named in order of difficulty were 4 (proverbs), 7 (analogies) and 9 (narrative completion). The last two named tests were also the most difficult for the other blood groups.

Garth (13), in 1922, found that 384 mixed and full blood Indians tested by 4 association tests, 3 memory tests and 2 word building tests showed "that the mixed bloods tend to excel the full bloods at all the tests on a score of averages, measure of per cent of the former to attain the median of the latter and as to the upper range of scores. The scores of the mixed bloods is favored by

their superior social status and educational opportunity." (P.234)

Garth (15), in 1922, gave the National Intelligence Test Scale A to Mexicans and full and mixed blood groups of Indians. The five groups tested arranged themselves in the following order for their intelligence when the per cent attaining the median score of Full Blood Plains and South East Indians was calculated: first, mixed bloods (descendents of Plains and S. E. Indians); second, Mexicans (mixtures of Spanish and Mexican Indian - all mothers were Mexican); third, full blood Plains and Nomadic S. E. Indians; fourth, full blood Pueblos (sedentary); fifth, full blood Apache and Navaho (nomadic). The ratios are respectively: 127, 107, 100, 88 and 77. When these same five groups were arranged both according to average amount of education and social status they show the same sequence as given above for their intelligence rating.

Concerning the effects of their knowledge of the English language he says, "The mixed-blood has more opportunities to learn English in the home because the English language is used to a greater extent than the Indian languages. In the full blood's homes, generally speaking, the Indian language is used to a considerable extent. Therefore, I would say that a mixed blood has a better opportunity to learn the English language than a full blood by reason of the difference in the home." (p.400)

Garth (17) finds that the median I.Q. of 1,050 full blood Indians in the United States Indian schools in Oklahoma and New Mexico is 67.7. I. Q.'s were based upon scores made on the National Intelligence Test, Scale A. He concludes "that facts regarding social status and Indian temperament must be considered before we can feel sure it correctly indicates the Indian level of intelligence." (p.125)

III. EXPERIMENTAL WORK

A-1. RELATION OF THE ALLEGED LANGUAGE HANDICAP OF THE AMERICAN INDIAN TO PERFORMANCE IN THE SINGLE TESTS OF THE STANFORD-BINET SCALE.

The problem was to determine the effect of the alleged language handicap of the American Indian upon his performance at the Stanford-Binet intelligence test. More specifically, the experimenter attempted to find out whether the Indians' language handicap effects some of the tests more than others in this scale.

a. Method: During the school year 1923-24 the experimenter tested twenty-six Indians in Haskell Institute and forty-two white pupils in the Lawrence Public Schools. The complete form of the Stanford Revision of the Binet-Simon intelligence test was used. The standard testing materials - pictures, blocks, etc. - were used. A watch with a second hand was used for timing the tests.

The experimenter wrote the responses of the subjects as nearly verbatim as it was possible to do. The testing of each subject extended down through the highest age level in which all tests were passed and stopped at the age level where all tests were failed.

The chronological ages of the Indians were secured

directly from the subjects. Their ages in years were later checked up with the files in the offices of the Assistant Superintendent. These files furnished no record of the month of birth of the Indians. The ages of the white pupils were obtained from the files of the Tests and Measurements Department of the Lawrence Public Schools.

The test results for each pupil were rechecked and mental age and I.Q. recalculated the day following the day on which the test was given and scored. Assumed basal ages were not counted when calculations were made.

The experimenter had had some previous practice in administering the Stanford-Binet tests. About fifteen tests were given during the winter and summer of 1923. And five Indians were tested immediately before those whose test results are used in this experiment. The experimenter's purpose in this preliminary testing was (1) to learn better how to get into rapport with especially the Indian child, (2) to improve her technic of presenting the tests, (3) to improve her methods of taking down the responses, and (4) to practice scoring the test results.

The mental ages of twenty-three tested Indians were matched with the mental ages of an equal number of tested white pupils. A summary of these subjects tested by the writer may be found in table A of the appendix.

In 1923 Myra Lingenfelter made a similar study based upon fifteen pairs of subjects - an Indian and a white pupil of equal mental ages. The same general methods of attack of the problem and of tabulation of results were used by the writer as had been used by the earlier experimenter.

b. Results: In order to find out what the combined results show, the data from these two groups of subjects, the twenty pairs and the fifteen pairs, were summarized. Not more than eleven subjects were represented at any one of the test age levels higher than twelve years or lower than eight years. Accordingly only the data for the test years VIII to XII, inclusive, are shown in table I.

Table 1.

Indian - White Comparison at Each Test.

Year	Test	Both Passed		Both Failed		Indian only Passed		White only Passed	
VIII	1	*(2	0)2	(5	1)6	(3	2)5	(3	2)5
	2	(8	2)10	(5	1)6	(0	2)2	(0	0)0
	3	(9	5)14	(2	0)2	(0	0)0	(2	0)2
	4	(8	4)12	(3	0)3	(0	1)1	(2	0)2
	5	(4	5)9	(2	0)2	(3	0)3	(4	0)4
	6	(2	3)5	(7	0)7	(3	2)5	(1	0)1
IX	1	(6	6)12	(4	2)6	(4	1)5	(0	3)3
	2	(9	5)14	(1	2)3	(3	2)5	(1	4)4
	3	(7	9)16	(4	2)6	(1	1)2	(2	0)2
	4	(6	4)10	(3	3)6	(3	4)7	(2	1)3
	5	(11	10)21	(3	0)3	(0	0)0	(0	2)2
	6	(4	4)8	(4	1)5	(2	0)2	(4	7)11
X	1	(4	4)8	(12	9)21	(2	1)3	(0	1)1
	2	(9	7)16	(3	2)5	(1	1)2	(5	5)10
	3	(14	8)22	(0	3)3	(2	3)5	(2	1)3
	4	(6	3)9	(6	7)13	(3	2)5	(3	3)6
	5	(7	2)9	(5	12)17	(4	0)4	(2	1)3
	6	(10	0)10	(3	9)12	(1	3)4	(4	3)7
XII	1	(1	0)1	(14	12)26	(1	0)1	(1	1)2
	2	(1	0)1	(12	11)23	(3	1)4	(1	1)2
	3	(3	2)5	(8	8)16	(2	3)5	(4	0)4
	4	(2	0)2	(13	11)24	(1	1)2	(1	1)2
	5	(7	1)8	(6	7)13	(3	1)4	(1	4)5
	6	(2	1)3	(10	10)20	(0	0)0	(5	2)7
	7	(2	3)5	(7	4)11	(7	4)11	(1	2)3
	8	(5	3)8	(5	5)10	(7	4)11	(0	1)1

* The black numbers inside the parenthesis show the writer's results.

The red numbers inside parenthesis show Miss Lingenfelter's results.

The number after parenthesis is the sum of the two.

This table should be read thus: In Test VIII - 1 the combined results show two cases where both the Indian and the white subjects passed; 6 pairs where both failed; six pairs where the Indians only passed and 5 pairs where only the Whites passed at the same test.

Of the thirty-five pairs of subjects the white subjects were the younger by two months to nine years in each of all but five pairs where the white subjects were older by two months to one year. Seventeen pairs of subjects exactly matched in mental age. The remaining eighteen pairs deviated from a perfect match in mental ages by one to three months.

In table 2-A may be found a summary of the test results for the five tests in which the Indians excelled most; and in table 2-B a similar summary was made for the five tests in which the white pupils excelled most.

Table 2-A

Tests in which Indians excelled most.

Year	Test	Both Passed		Both Failed		Indian only passed		White only passed	
XII	8	(5	3)8	(5	5)10	(7	4)11	(0	1)1
XII	7	(2	3)5	(7	4)11	(7	4)11	(1	2)3
VIII	6	(2	3)5	(7	0)7	(3	2)5	(1	0)1
IX	4	(6	4)10	(3	3)6	(3	4)7	(2	1)3
X	3	(14	8)22	(0	3)3	(2	3)5	(2	0)2

Table 2-B

Tests in which Whites excelled most

Year	Test	Both Passed	Both Failed	Indian only Passed	White only Passed
XII	6	(2 1)3	(10 10)20	(0 0)0	(5 2)7
IX	6	(4 4)8	(4 1)5	(2 0)2	(4 7)11
X	2	(9 7)16	(3 2)5	(1 1)2	(5 5)10
X	6	(10 0)10	(3 9)12	(1 3)4	(4 3)7
VIII	3	(9 5)14	(2 0)2	(0 0)0	(2 0)2

The most interesting result shown in the group of tests in which the Indians excelled most is test VIII-6, vocabulary test, which ranks third in the percentage gain of Indians over Whites at the same test. This test was passed by five pairs of subjects and failed by seven pairs of subjects. Five Indians passed where white subjects failed, while only one white subject passed where the Indian subjects failed in the same test. This tendency for an Indian superiority in the vocabulary test reappeared in year X-1. This test was passed by eight pairs of subjects and failed by twenty-one pairs of subjects. In the same test three Indians passed where the white subjects failed, while only one white subject passed where the Indian failed.

Concerning these vocabulary tests Burt (5) says, "The scale (Stanford-Binet) retains a marked linguistic bias. This is shown by Terman's own observation that in a large majority of cases

the vocabulary test, alone, will give an I.Q. within 10% of that secured by the entire scale." (p.71)

The Indians excelled most in test XII-8, similarities. This test was passed by eight matched pairs and failed by two matched pairs. Eleven Indians passed when the white subjects failed, while only one white subject passed where the Indian failed. The remaining three tests in which the Indian subjects excelled are XII-7, pictures, interpretation; IX-4, four digits backwards; and X-3, designs.

The test in which the white subjects excelled most is XII-6, five digits backwards. Three matched pairs of subjects passed and twenty pairs failed at this test. No Indian passed where the white subject failed, but seven white subjects passed where the Indians failed. The white pupils also excelled in tests, IX-6, rhymes; X-2, absurdities; X-6, sixty words; and VIII-3, comprehension.

A-2. RELATION OF THE ALLEGED LANGUAGE HANDICAP OF THE AMERICAN INDIAN TO SCORE IN THE INDIVIDUAL TESTS OF THE NATIONAL INTELLIGENCE TEST, SCALE A.

The results from the Indian-White comparison at the Stanford-Binet tests showed that the Indians excelled in some tests of a distinctly linguistic nature as well as in some tests of memory and perception. In order to get data from a reliably large number of subjects on a group scale of intelligence tests of a verbal type, the National intelligence test, Scale A was chosen as a basis for further comparison.

The problem was essentially the same as in the first section of thisStudy except that the National intelligence test, Scale A, was used in place of the Stanford-Binet tests.

The specific problems that were investigated are:

1. The relative performance of Indians and Whites at each of the tests within the National intelligence scale
2. The relation between Indian or White superiority at the tests and
   a. The relative variability of Indians' and Whites' scores at each of the tests
   (1). Correlation between the degree of Indian or White superiority and constancy of Indians' or Whites' scores, respectively, at each of the tests

b. High and low total test scores

c. Degree of Indian blood

a. Method: Two hundred twenty-two Indian test results at the National intelligence test, Scale A were secured from the files at Haskell Institute. These were matched, total score for total score, with an equal number of National test results of white children.* The test results for the white children were secured from the Tests and Measurements Department of the Lawrence Public Schools. The total scores of all of the test booklets were rechecked, but the tests were not rescored. The deviation from a perfect match in total test scores was not to exceed three points in any one pair. The mean deviation for the 222 pairs was .02 per pair in favor of the white subject's score. The two subjects of each of the 222 pairs were, then, approximately equal in mental ages.

b. Results: The mean score difference for the 222 pairs of subjects at each of the five tests in the scale was calculated. The probabilities of the validity of these mean differences were calculated from the Standard Error of the mean differences. The results are tabulated below:

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* Three negro subjects are represented among the 222 test results from the Lawrence Public Schools.

Table 3.

Test	I	II	III	IV	V
Mean Difference *	+ 2.15	+ 2.65	- 2.89	+ 2.36	- 4.20
Standard Error (M)	0.39	0.39	0.43	0.44	0.51

In each of the five tests the chances are 12,019,229 (or more) to 1 against this difference being a chance difference.

In order to find out what relation exists between the relative variability of the performance of the Indians and the Whites, and Indian or White superiority at each of the five tests, the coefficient of variability for each of the racial groups at each of the tests was calculated. The formula that was used is:

$$\text{Coefficient of Variability} = \frac{Q}{\text{Median}} \quad **$$

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* + means White superiority.

\- means Indian superiority.

** Yule, G. N., Introduction to Theory of Statistics, 1924, p.149.

Table 4.

Relation of variability of performance to Indian or White Superiority.

Test	Superiority		Coefficient of Variability.	
	Indian(-)	White(+)	Indian	White
I		+	.477	.366
II		+	.417	.323
III	-		.268	.343
IV		+	.662	.495
V	-		.346	.350

The data in table 3 shows that the white subjects were superior to the Indians of equal mental ages in test 1,arithmetic; test IV, same - opposites, and test II, sentence completion. The Indians were superior in test III, logical selection, and in test V, digit-symbol. In each instance the chances are 12,019, 229 (or more) to 1 against the difference being a chance difference. The mean differences between the xcores made by the Indians and the Whites in each of the tests are then substantial differences.

From table 4 it may be seen that the coefficients of variability of the Indians' test scores are less than those for the Whites in both tests III and V. In terms of mean score differences the Indians were superior to the Whites at these two tests. For

tests I, II and IV the coefficients of variability of the Whites' test scores are less than those of the Indians at the same tests. The mean score differences showed that the Whites were superior to the Indians in each of these three tests. These data show that there was a perfect positive correlation between relative constancy of performance within the group and superiority at the tests. This held for both the Indian and the White groups alike.

In order to find the relationship existing between the constance of Indian scores and the degree of Indian superiority over the white subjects at each of the tests, the Spearman's Foot rule formula was used. The formula is:

The corresponding values of Pearson's r were obtained from Rugg's tables * (p.402). The same calculations were made for the Whites. The calculations may be found in tables B and C of the appendix. These data show a correlation of + .41 between the degree of Indian superiority and the degree of constancy of their performance at all of the five tests. A zero correlation exists between the degree of white superiority and the degree of constancy of their performance at all of the tests.

The experimenter next determined the relation between both the degree of white superiority and the degree of Indian

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* H. O. Rugg, Statistical Methods Applied to Education. 1917.

superiority and the percentage of Indian blood.

Two hundred-twenty matched pairs of tests were divided into the following four groups according to the percent of Indian blood of the Indian subjects: full bloods (4/4), 113 cases; three-fourths Indian blood (3/4), 35 cases, these include Indians of all degrees of Indian blood from 4/4 to and including 3/4; one half Indian blood (1/2), 48 cases - all Indians of less than 3/4 Indian blood to and including 1/2; one-fourth (1/4) Indian blood, 24 cases - all Indians of less than 1/2 blood. The 220 pairs deviated from perfect matches in total test scores by an average of .01 per pair in favor of the Whites. The data are summarized in table 5.

Table 5.

Mean Score Differences for Blood Groups Ranked According to Degree of Indian Superiority.

TEST	INDIAN BLOOD							
	1/4	Rank	1/2	Rank	3/4	Rank	4/4	Rank
I	- .08	3	+2.45	5	+ 2.22	4	+ 2.23	3
II	+ 3.82	4	+1.18	4	+ 3.08	5	+ 2.58	5
III	- 3.00	2	-2.75	1	- 2.37	2	- 3.16	2
IV	+ 4.27	5	+ .87	3	+ 1.67	3	+ 2.36	4
V	- 5.04	1	-1.68	2	- 4.52	1	- 4.08	1

These data indicate that even though the Indians in each of the blood groups were superior to the Whites at tests III and V, yet there was no constant tendency for their relative superiority to either increase or decrease in going from the group of full bloods to the one-fourth bloods. And even though the white subjects maintained superiority over the Indians of each of the blood groups in tests I, II, and IV, except for the one-fourth blood group at test I, yet this superiority was not consistently greater in any one of the blood groups.

In order to determine whether the Indian or White superiority in terms of mean score differences is uniformly greater in the group of matched tests of highest total test scores and less in the group of tests of lowest total test scores, the two hundred-twenty matched pairs of tests were grouped into quintiles.*

The range of the total test scores within each quintile may be found in table E of the appendix. The number of Indians from each blood group in each quintile is summarized in table D of the appendix.

The Mean Score Differences for the quintile groups at each of the five tests are as follows:

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* 1/5 means the quintile of highest total test scores, and 5/5 means the quintile of lowest total test scores.

Table 6

Mean Score Differences For Each Quintile.

TEST	QUINTILES				
	1/5	2/5	3/5	4/5	5/5
I	+ 2.09	+ 1.09	+ 2.10	+ 1.95	+ 2.95
II	+ 3.10	+ 2.38	+ 2.90	+ 2.63	+ 1.97
III	- 3.30	- 3.00	- 3.30	- 3.25	- 1.85
IV	+ 1.20	- 1.85	+ .43	+ 2.81	+ 2.80
V	- 3.10	- 2.36	- 2.06	- 4.10	- 6.00

These data show no consistent tendency for the mean differences to either increase or decrease in going from the quintile of highest total test scores (1/5) to the quintile of lowest total test scores (5/5). It may be seen from table E that the range in scores for each of the inner quintile groups is not to exceed 50% of the range in scores for either the highest or the lowest quintiles alone. In order to more nearly equalize the factor of range in scores, the Mean Score Differences for the three inner quintiles were averaged. The combined 2/5, 3/5, and 4/5 quintiles include 132 matched pairs whose range in total test scores is 34 points. The combined data follows:

Table 7.

Mean Score Differences For The Combined Three Innner Quintiles.

TEST	QUINTILES		
	1/5	2/5, 3/5, 4/5	5/5
I	+ 2.09	+ 1.71	+ 2.95
II	+ 3.10	+ 2.65	+ 1.97
III	- 3.30	- 3.15	- 1.87
IV	+ 1.20	+ 1.36	+ 2.80
V	- 3.10	- 2.84	- 6.00

From the above table it may be seen that in test II there was a tendency for the quintile of highest total test scores (1/5) to produce the greatest amount of White superiority; the mean of the next three quintiles of lower total test scores produced less White superiority; and the quintile of least total test scores (5/5) produced the least amount of White superiority. The same general trend was shown for the Indian superiority in test III. The situation was reversed for the White superiority in test IV. The mean differences for the quintiles in Tests I and V show no constant tendency either one way or the other. But in test V the Indians were most superior to the Whites in the lowest (5/5) quintile. Table D shows that this quintile (5/5) contained the largest number of full bloods. It may be that the full bloods generally are better at the digit-symbol

test (V) than are the mixed bloods.

An inspection of tables 6 and D shows that there is no constant relation between the percentage of full bloods in each quintile and the degree of Indian superiority at tests III and V. The three inner quintiles combined contain 54% of full bloods, the highest quintile 31%, and the lowest quintile 65%. These percentages show that in general the full bloods made the lowest scores while the one-fourth bloods made the highest scores. A comparison of tables D and 7 shows that White superiority at test II decreases with each corresponding increase in percentage of full bloods in the quintiles. This relation is reversed in test IV. Test III shows a constant decrease in degree of Indian superiority with corresponding increases in percentage of full bloods in the quintiles. In test V this relation tends to be reversed. These two tables show some tendency for the full bloods to make the lowest total test scores, but neither do they uniformly produce either the greatest or least amount of Indian superiority at tests III and V, nor is the White superiority in tests, I, II, and IV either consistently greater or less in this quintile.

A summary of the details of the results just presented follows:

The two hundred and twenty-two pairs of subjects showed a substantial superiority of the Indians in test III, logical selection and in test V, digit symbol. The Whites were superior by equally substantial Mean Score differences in test I, arithmetic, test II, sentence completion, and test IV, same-opposites.

The Indians' test scores were less variable than the Whites' at the tests that showed Indian superiority. The Whites' test scores were less variable than the Indians' at the tests that showed White superiority.

There was a correlation of + .41 between the degree of Indian superiority and the degree of constancy of their scores in the tests. An indifferent correlation was found between the degree of White superiority and the degree of constancy of their test scores.

No constant relationship was found to exist between either the degree of Indian or of White superiority at the tests and the percent of Indian blood. The Indians of all blood groups maintained their superiority in tests III and V. The Whites maintained their superiority over the Indians of all blood groups in tests II, IV, and in I except for the 1/4 blood group, which showed a Mean Score Difference of .08 in favor of the Indians.

Full bloods comprised the largest percentage of the quintile of lowest total test scores. They made up the least percentage of the quintile of highest total test scores.

In each of the tests either a White or an Indian superiority was maintained throughout all quintiles of total test scores. The degree of superiority fluctuated throughout the quintiles.

B. RELATION OF THE AMERICAN INDIANS' FAMILIARITY WITH THE SITUATIONS PRESENTED IN LINGUISTIC TESTS TO SCORE ON THE TESTS.

The data that have been presented in the two preceding sections of the experimental work of this thesis show that Indians and Whites of equal mental ages exhibited differences in their performances at certain of the individual tests of the two scales used. The Indian inferiority at the verbal tests might be attributed to their language difficulty. The Indian superiority at others of the tests must be explained in another way. The following two factors might contribute to produce the differences shown: (1) Superior perceptual and memory powers for concrete situations of a non-verbal type and inferior powers in the mental processes required in abstract situations are sometimes attributed to the Indian. (2) It is conceivable that some of the tests within these two scales present situations that are less familiar to the Indian than to the American white people.

The writer offers the succeeding facts concerning the plausibility of an experimental investigation of the effects of each of the two factors stated above. The authors of the two intelligence tests that were used do not report the specific mental processes that each of the tests within the scales measure. It is, therefore, impossible to conclude from our data on these tests anything concerning the mental processes in which the Indians might be inferior to

the Whites. This leaves for consideration a possible factor of common experiences. It is generally known that when the Stanford-Binet test was first used in England certain modifications were necessary in order to adapt them for use with London children. Burt (5) reports that "American phraseology and colloquialisms will need to be eliminated. For example, the English six-year-old child would hardly understand the question: 'What's the thing to do if you're going some place and miss your car?' " (p.71). It would be reasonable to believe that the Navaho Indian six-year-old child, who in some instances lives 160 miles from a railroad, would not understand the same question. Other instances might be imagined in which the Indians do not have a fair chance at the tests because they do not generally enjoy the White Man's civilization, customs and habits. The experimenter has attempted to investigate the effect this factor of common experiences upon Indians' scores in tests.

The present section of this thesis reports the results of both Indians and Whites at tests which were devised to demonstrate the possibility of improving the Indians' relative score at verbal tests by presenting situations which are probably more familar to the Indian than are some that are found in both the Stanford-Binet and the National tests. These tests do not purport to measure the intelligence of the subjects.

1. FORMULATION OF THE TESTS.

The writer will present an account of the formulation of the tests under the following points: (1) selection of tribes for whom the tests were to be made; (2) means by which material for tests were obtained; (3) making the tests.

The Indians in school at Haskell Institute are probably the most heterogenous group of Indians that are in any one school in the United States. These Indians represent 72 different tribal mixtures who come from all parts of the United States. And they represent widely different stages of Indian civilization. Moorehead (61) reports in 1914 that "the Navahoes still keep up ancient customs, arts and ceremonials". (p.241). Concerning the Five Civilized Tribes he says, "While these Indians follow some of the ancient customs, the bulk of them have far departed from the faith of their fathers". (p.133) Curtis (43) reports, in 1917, that "different Indian tribes differ widely in their life and customs." (p.27)

After some preliminary investigations among the Haskell Indians the experimenter concluded that it would be impracticable for one who knew practically nothing of Indian life on the reservation to attempt to find those Indian experiences, which are common to most of the tribes represented at Haskell Institute. This course of procedure seemed especially to be discredited when administrators and teachers at Haskell, who know Indian life on the reservations, re-

ported that considerable of the literature dealing with the customs and habits of the Indian is highly colored. In 1917 Moorehead wrote that "the public has had presented to it great numbers of books, pamphlets and articles, all dealing with the Indian and most of them regard him from what is known as the popular point of view." (p.17) The experimenter, therefore, restricted herself to a study of the following three tribes: Sioux, Potawatomi and Navaho.

The chief reasons for selecting these three tribes are:

1. The Sioux is one of the less civilized tribes of whom a comparatively large number attend school at Haskell Institute.

2. The Potawatomi tribe sends more young children to school at Haskell than does any other one tribe. And Lindquist (56) reported in 1923 that "general civilization among the Potawatomi will bear comparison with conditions among the whites who live on the reservation". (p.199). This tribe was then desirable to study not only because it furnished young subjects but also because their living conditions were comparable with some white people of Kansas.

3. The Navaho tribe was selected because they are one of the most primitive tribes still unspoiled by civilization. Lindquist (56) reports that "In a country so isolated (the Navaho's) social conditions change slowly, and the people are tenacious of old forms and old customs" (p.280). Furthermore, this tribe furnished

an all-full-blood tribal group for the present study.

These three tribes come from different parts of the United States: the Sioux come from eight tribal agencies in North and South Dakotas, and Nebraska; the Potawatomi come from their reservation at Mayetta, Kansas; the Navahoes come from four tribal agencies in Arizona and New Mexico.

Some of the experiences of the students of these three tribes were learned from literature on Indian life; but the most was learned by talking to the Indian boys and girls.* The Indians who were interviewed were selected from among those that their teachers had suggested would likely give the most reliable information concerning every day life on their respective reservations. Most of the students were interviewed during the regular school hours in a quiet room which was placed at the experimenter's disposal. Generally these students were alone with the experimenter, excepting for three instances in which two students were interviewed at the same time. This did not prove entirely satisfactory because, even though both persons in each of the pairs came from the same tribal agency and had reported interest in my investigation, yet it was evident that one of them felt that the other was "telling more than he or she should." It is generally conceded that the Indian is timid when someone whom they do not

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* The writer is very grateful for the help rendered by Principal G. E. Peters of Haskell Institute in securing suitable subjects for the interviews.

know begins work among them. Their timidity was, however, not particularly evident to the experimenter. This may be chiefly attributed to these facts: (1) Most of the students interviewed were the more intelligent members of their tribes. Some of them have had considerable experience among the people of their own and other tribes and have therefore learned to appreciate help rendered by the white people to their respective tribes. (2) The experimenter made every attempt to interest the student in her problem in an informal manner.

Quite generally the information that was given by the Sioux and Potawatomi students, as common to the people of their respective agencies, checked up reliably with what others of the same agency reported. The chief sources of difficulty were: (1) To find experiences that are quite common to the students of all agencies of their respective tribes. This applies only to the Sioux and Navaho because the Kansas Potawatomi students are all from one agency. (2) Reports from the Navaho students were the most conflicting. This may be partly explained by a statement, concerning the Navaho, made by Lindquist (56) in his recent book, The Redman of the United States: "Some among the young people have been influenced by church and school, but these run the risk of ridicule and possible ostracism." Mrs. Grace, a teacher at Haskell, who knows the Navaho on his reservation very well, says that before the Navaho child leaves for a non-reserva-

tion school he is sometimes requested by his parents to carefully select such information about the Navaho tribe as he might give to white people. The experimenter was of course not interested in their tribal ceremonials and religious practices.

When the material was being selected for the tests, the experimenter was guided by the following principles: (1) Experiences, which I felt most sure to be common to a majority of the students of the tribe, were selected. It was not the experimenter's intention to select experiences which are peculiar to only the persons of the one tribe. For example, although each of the following samples were placed in one of the tests for a particular tribe, yet the situations presented in the samples are possibly equally familiar to the subjects of all three tribes tested: (a) Do teepes always have chimneys? (b) Every medicine man can make pills sing perform an operation. (c) Trachoma is a kind of flower soil disease food. (2) The experimenter selected the yes-no and the multiple choice types of tests because she believed that the scores in them would be least effected by the Indians' possible difficulty with grammatical forms of the English language and would be more directly determined by the subject's knowledge of the situations presented in these tests than in any one other verbal test with which the experimenter is familiar. Tests which were best adapted to administration by simple oral instructions were especially to be desired, because

any difficulty that the Indian might have with written instructions is thereby avoided. (3) The material which seemed best adapted to these two types of group tests was selected. The situations were presented in as simple language as possible and Indian colloquialisms were sometimes used. For example: frequently the Indians reported that the root of the soap weed was quite generally made into a kind of soap. But they knew nothing of the yucca, which is the English name for the same plant. (4) Twenty-two questions, which required only an answer of yes or no, were made to fit into the experiences of the first and second grade Potawatomi pupils. (5) The experimenter did not intend to measure the intelligence of the subjects with the tests.

The six tests that comprise the final form of the group test that was given to both the pupils of the three tribes and to the white subjects all above the second grade are:

(1) One of each the multiple choice and yes-no types of test based upon Potawatomi experiences. These are tests 1 and 3.

(2) One of each the multiple choice and yes-no types of test based upon Sioux experiences. These are tests 2 and 4.

(3) A multiple choice type of test involving Navaho experiences - test 5.

(4) Twelve signs taken from the several Indian sign languages were used in test 6. (tests 6 and 7 in the test booklet).

The final form of both the tests and directions to the subjects may be found in the appendix (H).

2. THE SUBJECTS; ADMINISTRATION OF AND SCORING THE TESTS.

The 181 Indian students that were tested were those of the three tribes - Sioux, Potawatomi, and Navaho, who were available at the close of the school year 1924-'25. Some of the Indians of the Sioux and Potawatomi tribes were not available for testing at that time because of both school or manual duties, and others had left for their homes. The white subjects were all those in two graded schools, and the Junior and Senior high schools of the Lawrence Public Schools who cared to stay for the test after the regular afternoon sessions of school in their respective buildings. 124 out of the 187 white subjects were in the first six grades of the McAllaster and Cordley schools. Not more than 15 white pupils out of these 6 grades that were tested were unable to stay for the test. The majority of the white students who volunteered for the tests in the Junior and Senior high schools appeared to belong to homes of the better social status in Lawrence. Because the white subjects were not selected by a random sampling method the results of their performance at the tests do not furnish a statistically ideal group for an Indian-White comparison. These facts just presented might give the reader some basis for an opinion of the two racial groups of subjects that were tested. The

grade and age distributions for both the Indians and the Whites may be found in tables F and G of the appendix.

The tests were administered by the writer. The white subjects were tested immediately after the close of the afternoon session of school in their respective buildings. The test periods for the Indians were at various times of the day from 7:15 A.M. to 6:15 P.M. Some teacher or supervisor remained in the class room during a part or all of each of the test periods in the public schools. Only the experimenter was present with the Indian subjects when the examinations were given at Haskell. The white subjects were tested in groups from twenty-six to forty-five pupils each. The Indians were tested in groups of from nine to thirty pupils each. The First and Second Grade Potawatomi and White subjects were tested in one group each.

The time to be allowed for each test was determined upon the group of 25 fifth grade public school pupils, who were the first to be tested. Time was called on each test when at least four of the twenty-five pupils had finished. Test six, sign language, proved to be too easy for this group so it was made more difficult for the remaining groups by changing the method of presenting the test. The time limits and method of presenting the tests, excepting for the one group at test 6, remained the same for all groups tested. No specific time limit was set for the First and Second grade subjects.

For these each question was repeated immediately after it was once given and the next question was not given until all subjects had finished.

No copying was noted. But in the case of some twelve pupils, eight white and colored and four Indians, it was evident that they did not work at one or more of the tests. Their test booklets were discarded immediately after all the pupils had left the room. These were the only evidences of unwillingness to work at the tests.

It was interesting to note that at the close of the examination a number of the Indians voluntarily reported that they believed they knew more about the things in the test which they had just finished than about some other tests that had previously been taken.

The following data for each student were obtained from the Haskell files: tribe, agency, degree of Indian blood, age, and school grade. The tests were scored by the right minus wrong method. They were all rechecked and rescored.

3. Results:

a. On tests for subjects above the second grade.

The data presented in tables 8 to 17 exhibit what the test results show in answer to the following questions:

1. What is the relative performance of the Whites and

each of the Indian groups in each of the tests

a. At each age level?

b. At each grade level?

2. Which of the tests do the test results show to be best suited to each of the Indian tribal groups?

3. Does test 5 (devised for the Navaho) furnish any sentences which would show the Navaho score more nearly approximating that of the Whites than is shown for all of test 5?

4. What is the relation of percent of Indian blood to total test scores at each age level?

5. What is the relation of percent of Indian blood of all eighteen year old Indians together to score in each of the six tests?

6. What is the relation of percent of Indian blood of the eleventh grade Sioux Indians both to score in each of the tests and to age?

The data bearing upon each of these questions will be discussed in the same order. The age and grade distributions for both the Indians and Whites in tables F and G of the appendix show that at certain of both the upper age and upper grade levels the white subjects were either relatively few in number or no white subjects were represented. This has made it impossible to make complete comparisons between the Indians of all ages and white

subjects. The number of subjects, both Indian and White, are relatively few at nearly all points where comparisons were made. These facts indicate that the data lend themselves to only simple statistical treatment.

Table 8

Showing the mean score made by each of the four groups at each age level (8-21 inclusive). Mean score for each of the tests separately and for total test scores.

Test	Group	AGE 8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	White	5.09	8.70	8.55	11.00	12.17	11.71	14.62	15.90	14.70	17.08	17.33			
	Sioux							13.40	9.33	13.40	14.72	13.94	11.80	15.32	13.09
	Potaw.	2.40	1.66	2.80	4.60	6.33	4.57	4.75	7.50	11.33		14.00	14.14		
	Navaho								11.50		4.63	5.72	6.50	10.00	
2	White	2.18	3.79	4.45	5.27	7.23	7.57	8.00	8.63	8.90	12.25	9.16			
	Sioux							13.40	11.66	9.80	10.18	10.10	10.40	10.44	9.45
	Potaw.	1.80	0.00	4.40	4.80	6.50	6.28	4.75	5.50	4.33		5.33	9.42		
	Navaho								9.50		3.90	4.72	4.00	9.66	
3	White	1.63	2.75	2.30	5.31	5.41	8.50	8.00	9.27	10.90	12.00	7.80			
	Sioux							11.40	9.00	10.40	12.63	11.79	10.40	12.77	13.27
	Potaw.	1.60	1.00	3.00	3.60	6.66	3.85	9.00	12.00	8.00		6.66	13.14		
	Navaho								7.50		1.90	3.72	3.50	11.33	
4	White	3.45	5.08	4.30	7.13	8.06	7.71	8.25	10.81	10.20	11.50	10.00			
	Sioux							11.40	11.33	10.30	13.00	12.31	14.30	12.33	12.27
	Potaw.	1.80	2.00	7.40	4.40	8.66	5.14	10.25	9.50	11.00		10.66	8.71		
	Navaho								8.00		3.63	4.45	4.50	12.33	
5	White	1.45	1.95	3.85	4.86	4.82	5.71	10.62	9.72	11.40	12.75	13.00			
	Sioux							6.00	8.00	5.10	9.72	8.63	11.00	10.66	8.90
	Potaw.	1.60	0.00	2.80	1.20	2.83	2.14	5.00	4.00	5.00		11.66	7.71		
	Navaho								9.00		4.18	6.63	4.83	15.00	
6 (7)	White	6.00	10.52	9.09	12.50	16.26	16.46	13.87	15.09	12.40	16.08	12.33			
	Sioux							23.60	19.00	19.30	18.08	18.68	18.60	17.88	17.54
	Potaw.	13.00	8.66	12.40	7.00	12.16	8.42	10.25	10.50	17.66		20.66	19.00		
	Navaho								21.50		12.54	13.81	11.00	20.33	
To-tal Test Score	White	19.80	30.10	29.54	46.00	55.80	58.76	63.36	69.44	68.50	82.41	74.64			
	Sioux							79.20	68.33	68.30	78.36	75.46	76.50	79.42	74.53
	Potaw.	22.20	13.33	32.80	25.60	43.16	30.41	44.00	49.00	57.33		68.97	72.14		
	Navaho								67.00		30.81	39.08	34.34	78.66	

Table 8 shows that the Sioux scored higher than either the Whites or the other tribal groups at each of the age levels where comparisons where made with the Siouxs in tests 4 and 6.* The Sioux also scored the highest at all except the seventeen year level in test 2. At this age level the Whites scored on the average 1.05 points higher than the Sioux. These results show that the Sioux of all ages, 14 to 19 years, tend to be superior to all other groups at the same ages in those tests which were devised to fit the experiences and environment of the Sioux. The Sioux also scored higher than the Whites at the most of the age levels in test 3.

The Potawatomi did not uniformly score as high as either the Whites or the Sioux at any one of the tests. They did score as high or higher than the Whites at four of the ten age levels in both tests 3 and 6. This shows a tendency for the Potawatomi to surpass the Whites at some of the age levels in two of the three tests which present Potawatomi experiences. In test 1, also a Potawatomi test, they are surpassed by both the Whites and Sioux at all age levels. An inspection of the sentences in tests 1 and

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* For the convenience of the reader, the following key for the tests is offered: test 1, yes-no type, devised for the Potawatomi; test 2, yes-no type, for the Sioux; test 3, multiple choice, for the Potawatomi; test 4, multiple choice, for the Sioux; test 5, multiple choice, for the Navaho; test 6 (no.7 in test booklet), sign language, mainly for Potawatomi and Sioux.

3 shows that the latter test presents more situations which are probably more familiar to the Indian than to Whites than does test 1. The writer would cite sentences 4, 5, 8, 9, 12, 18 and 19 in test 3 as examples of "Indian sentences". In test 1 questions 13, 14, 15 and 16 are about the only peculiarly "Indian questions".

The Navaho scored almost uniformly lower than any one of the other groups at all tests including test 5, a test which presents Navaho experiences.

The Whites tested consistently higher than any one of the Indian groups at only test 1. At 63% of the age levels the average of the total test scores of the Whites were higher than those of the Indian groups. The total test scores for the Sioux most nearly approximate those of the Whites at each age level. At no one age level was the average of the total test score for the Sioux more than 4.05 points lower than that for the Whites, while at the 14 year level the average for the total test scores of the Sioux was 15.14 points higher than that of the Whites.

Table 9

Showing the Mean Score made by each of the four groups at each Grade Level (3-12 inc.). Average scores for each test separately and for total test scores.

Test	Group	GRADE 3	4	5	6	7	8	9	10	11	12
1	White	6.33	6.72	11.20	11.07	14.55	13.58		15.73	17.54	16.90
	Sioux					11.14	11.50	13.75	14.56	13.88	14.54
	Potaw.	2.11	1.77	5.37	4.33	7.33	11.00	12.00	12.24	15.50	
	Navaho			2.50	2.00	4.16	7.57	9.33		10.00	12.50
2	White	1.08	3.82	5.02	6.75	7.33	7.91		9.36	9.36	11.80
	Sioux					8.14	11.50	10.08	10.42	10.09	11.81
	Potaw.	1.22	2.44	5.00	5.66	10.05	5.25	10.50	5.00	8.50	
	Navaho			2.50	2.00	4.50	7.14	5.50		9.66	5.50
3	White	1.42	2.06	3.88	5.46	7.66	8.66		10.78	9.72	11.20
	Sioux					9.14	10.37	10.08	12.71	12.55	13.18
	Potaw.	2.00	1.77	4.42	5.66	9.50	5.50	14.50	11.75	13.00	
	Navaho			0.00	.66	2.50	3.28	5.33		11.33	12.00
4	White	3.25	4.34	6.20	7.28	8.44	8.25		10.36	11.27	11.30
	Sioux					9.43	11.75	11.50	12.56	12.45	14.45
	Potaw.	2.44	3.22	5.50	8.33	11.33	11.00	10.00	9.25	11.00	
	Navaho			0.00	1.83	2.81	5.00	8.16		12.33	10.00
5	White	1.50	1.66	4.24	4.60	8.11	7.91		11.42	12.09	12.70
	Sioux					4.57	7.37	6.58	8.56	9.81	11.45
	Potaw.	1.11	0.44	2.62	5.00	4.50	4.25	7.00	8.50	9.50	
	Navaho				.50	3.50	5.71	11.16		15.00	16.00
6	White	8.16	9.45		11.32	20.55	19.50		13.89	13.00	18.50
	Sioux					19.85	20.37	19.16	18.85	17.51	20.00
	Potaw.	10.44	12.66	8.28	7.66	10.82	14.75	17.00	19.25	18.50	
	Navaho			6.00	9.16	10.82	16.28	18.16		20.33	22.00
Avg. of total test score	White	21.75	28.08		46.50	66.66	65.83		71.57	73.00	82.40
	Sioux					62.28	72.87	71.16	77.85	76.30	85.81
	Potaw	19.32	22.33	31.13	36.66	54.00	51.75	71.00	66.00	76.00	
	Navaho			11.00	16.16	28.33	45.00	57.66		78.66	78.00
Avg. Age	White	8.41	9.31	10.44	11.96	12.22	13.66		15.78	16.63	17.40
	Sioux					17.14	16.87	17.66	18.71	19.57	20.81
	Potaw.	9.44	12.00	12.25	14.33	14.00	16.00	17.00	17.00	19.00	
	Navaho			16.50	17.50	17.16	17.85	17.16		20.66	19.50

The data presented in table 9 show the effect of the equalization of school attainment among the tribal groups and the Whites upon their relative test scores. The Indians are from 1 to 6 years older than the whites of the same grades. A comparison between the relative scores at the grade and age levels (tables 8 and 9) shows certain differences and similiarities in their trend. In tests 2 and 4 the Sioux maintained their superiority over the Whites at all age and grade levels. The Sioux were on the average from 2.9 to 4.9 years older than the Whites of the same grades. Test 3 is the only test in which the Sioux's advantage in age at each grade level seems to have produced uniformly Sioux superiority where it was not also found throughout all age levels for the same test. Sioux superiority was found at all age levels for test 6, but they show superiority at only 5 of the 6 grade levels. The Whites maintained their superiority over the Sioux at the most of the grade levels in each of the remaining tests. It is generally conceded that equalization of the school attainment among students does indicate about equal ability to get meaning from simple sentences like those that are found in these tests. Accordingly it seems that the Sioux, who had the added advantage of age, but still made uniformly lower test scores than the Whites in tests 1 and 5, was decidedly less familiar with the situations presented in these latter two tests than were the white subjects. A comparison of the averages of the total

test scores for the Whites and Sioux at the age and grade levels show that, while the Whites surpassed the Sioux at all age levels, they were surpassed by the Sioux at 4 of the 5 grade levels. In only a general way this indicates that even though the Sioux were unable to attain the scores made by the Whites at the grade levels for tests 1 and 5, their advantage over the Whites in age was a factor in producing their greater superiority over the Whites at the grade levels in tests 2 and 4 than was found at the age levels.

In test 3 the Potawatomi show their greatest tendency toward surpassing the Whites. They surpassed the Whites at 4 of the 10 age levels and at 6 of the 10 grade levels. The Potawatomi were older by 1 to 2.5 years than the Whites of the same grades. The age factor seems to favor the Potawatomi superiority as it did the Sioux superiority. In each case the most striking effects were shown in the tests that were devised for the particular tribe. The average of the total test scores of the Potawatomi were uniformly lower than those for the Whites at all age and grade levels.

The Navahoes scored almost consistently lower at all grade and age levels than the Whites. They showed their greatest tendency to surpass the Whites in test 6, where Navaho superiority occurs at two of the five age levels and at two of the three grade levels. The Navahoes were from two to five years older than the

Whites of the same grades. The total test scores show that the Whites surpassed the Navahoes at all age levels and at all but one grade level.

These White-Indian comparisons tend to show that the Potawatomi and Sioux tribal groups tend to at least maintain their superiority over the Whites of the same grades in one or both of the tests devised for the respective tribes. But these two tribal groups did not tend to surpass the Whites in more tests at the grade levels than they did at the age levels. For both of the tribes this seems to indicate their lack of familiarity with the situations presented in those tests which were not specifically devised for the particular tribe.

The data presented in table 10 show in a general way what the test results indicate to be the tests best adapted to each of the four groups tested. It is impossible to read this table from left to right because the four groups vary both in size and in average age. The comparisons which follow are based upon tables 8 and 10.

Table 10

Percent of Possible Score (P.S.) for each group at each test.

	GROUP							
	WHITE		SIOUX		POTAWATOMI		NAVAHO	
TEST	% P.S.	Rank	% P.S.	Rank	% P.S.	Rank	% P.S.	Rank
1	65 %	1	69 %	3	35 %	2	51 %	2
2	35 %	4	53 %	5	24 %	5	22 %	6
3	33 %	6	55 %	4	31 %	4	27 %	5
4	34 %	5	78 %	2	32 %	3	28 %	4
5	40 %	3	45 %	6	22 %	6	44 %	3
6	53 %	2	78 %	1	51 %	1	66%	1
Number	157		78		50		33	
Avg. Age	12.86		18.46		14.55		18.05	

Test 1 was least difficult for the white subjects. And this was the only test at which they surpassed each of the Indian groups at all age and grade levels. Test 6 was least difficult for each of the Indian tribal groups. At this test the Whites were surpassed by the Sioux at all age levels; by the Potawatomi at 4 of 10 age levels; and by the Navaho at 2 of 3 age levels. At no one of the other tests was there so definite a tendency for all of the tribal groups to surpass the Whites. The Potawatomi and Sioux attained their

next to the largest percent of the possible scores in one of the two tests which were devised for the respective tribes. Test 5, a test for the Navaho, was most difficult for each of these same two tribes. The Navaho made their third from the largest percent of the possible score in test 5. These results show that each of the Indian groups made either their next to their largest or third to their largest percent of the possible score in one of the verbal tests which were devised for them. And the Whites made their largest percent of the possible score at test 1, which, upon inspection, seems to present more situations that are familiar to the Whites than does any one of the other tests.

The test results of the Navahoes were singled out for further investigation for two reasons: (1) their scores at all tests were almost uniformly lower than those for any one of the other groups. (2) The Navahoes are all full blood Indians. The writer will present such data as the test results provide concerning the two following points: (1) the relative performance of Navahoes and Whites, who made about equal total test scores, in each of the tests; (2) the possibility of selecting sentences from test 5, Navaho test, at which the Navaho should more nearly approximate the average score made by the Whites than is shown in the comparison by age levels.

(1) The experimenter was able to match the total test

scores of only 23 of the Navahoes, to within 3 points, with the total test scores of white subjects, who were also as near their equal in ages as were obtainable. The total test scores of seven pairs matched exactly. The total test scores of the Whites were on the average .43 points per pair higher than the Navahoes'. The Navahoes were from 3 to 9 years older than the Whites. They were also on the average 1.43 grades in advance of the Whites with whom they were compared. The data are presented in table 11.

Table 11.

Relative performance of 23 Whites and 23 Navahoes, whose total test scores match.

	WHITE			NAVAHO		
TEST	Mean Superiority	Possible score	Percentage of possible score	Mean Superiority	Possible score	Percentage of possible score
1	3.73	19	20 %			
2	2.04	20	10 %			
3	1.47	20	7 %			
4	.47	23	2 %			
5				3.08	18	17 %
5 (" 9 Selected Sentences")				2.42	9	25 %
6				2.82	24	11 %

The Whites were superior to the Navahoes in each of the first four tests. The Navahoes were superior to the Whites in both tests 5 and 6. In test 5 the average Navaho superiority is equal to 17 % of the possible score.(2) By a more careful selection of the sentences in test 5 the average Navaho superiority was raised to 26 % of the possible score at the nine sentences. These data tend to show that it would be possible to better adapt the test situations to Navaho experiences than do the eighteen sentences of test 5. Table 12 supports this view.

Table 12

Relative performance of 15 Navahoes and 15 Whites at test 5 and at " 9 selected sentences " of test 5.

	GROUP	
	NAVAHO	WHITE
Av. Score test 5	8.3	11.2
Range	3 to 16	6 to 17
% of P.S.	46 %	62 %
Av. Score "9 of 5"	4.8	5.1
Range	1 to 9	1 to 9
% of P.S.	53 %	56 %
Av. Age (years)	17.3	16.6
Range	16 to 18	15 to 18
Av. Grade	9.8	11.2
Range	6 to 9	8 to 12

These data show that the Navahoes made 7 % more of the possible score at "9 selected" sentences, while the Whites made 6 % less at those same sentences than the groups had made at the entire test. The same percentages show that, while the Navahoes made an average score which was equal to only 73 % of the average score made by the Whites at test 5, their average score at the "9 selected" sentences was equal to 94 % of the average score attained by the Whites at the same sentences.

Tables 13 to 17 summarize such evidence of the effect of Indian blood upon test score as the test results afford.

Table 13.

Blood groups in each tribe.

TRIBE	BLOOD				Average % Indian Blood
	4/4	3/4	1/2	1/4	
Sioux	11	22	30	18	57.89 %
Potawatomi	13	23	13	1	76.14 %
Navaho	33	0	0	0	100. %

Table 14

Average total test score of each blood group in each tribe at the age levels.

Tribe	Blood	AGE 8	9	10	11	12	13	14	15	16	17	18	19	20	21
Sioux	4/4									62.00		39.70		88.00	68.50
	3/4							75.00	70.00	65.00	79.00	74.60	73.00	70.50	87.00
	1/2							96.00		65.50	73.33	72.65	72.60	84.50	76.50
	1/4							77.00	67.50	81.50	80.66	78.60	91.50		
Potaw.	4/4		16.00	22.00	15.00	49.33	12.00						62.66		
	3/4	23.33	12.00	32.00	25.00	11.00	49.	33.66	49.00	38.50		56.00	72.00		
	1/2	20.50		56.00	38.00	50.00	39.	75.00		95.00		66.00	81.66		
	1/4											85.00			
Navaho	4/4								67.00		30.81	39.08	34.34	78.66	

A comparison between tables 13 and 14 shows that the Sioux, who were on the average 57.89 % Indian blood, most nearly approximated the total test scores made by the Whites at each age level where one or both of the other two tribal groups were also represented. The Potawatomi, who were on the average 76.14 % Indian blood, were next to the nearest in approximating the average total test scores of the Whites. And the Navaho, who are all full bloods, made the least average total test scores. These same tendencies were also shown for the individual tests at the age levels (table 8) where subjects of all three tribes were represented. This last fact seems to indicate in a general way that difference in average percent of Indian blood of the Indian subjects was a factor in producing score at the individual tests. But the fact that the Indian superiority over the Whites was shown at certain tests tends to indicate that familiarity with the situations presented in the tests was also a factor in producing score at the tests.

From table 14 it may be seen that the averages for the total test scores made by the full blood Sioux was less than that for the 1/4 Sioux at 6 of the 8 age levels. And at 8 of the 11 age levels for the Potawatomi the averages of the total test scores increased with each succeeding decrease in percent of Indian blood. More than one blood group was found at only one of the remaining

three Potawatomi age levels. At 63 % of the combined Potawatomi and Sioux age levels there was a definite tendency for the averages of the total test scores to increase with decrease in percent of Indian blood. In only 16 % of the age levels was the reverse tendency shown. The Navahoes are all full bloods.

Table 15

Mean score for each test and for total test scores for each of the * 18 year old blood groups.

			TEST						TOTAL
			1	2	3	4	5	6	TESTS
		P.S.	19	20	20	23	18	24	124
Blood	Sub-jects	Group Compo-sition	M.S.	M.S.	M.S.	M.S.	M.S.	M.S.	M.S.
4/4	14	78% Nav. 31%Sioux	5.81	4.27	4.00	5.45	5.45	14.42	39.40
3/4	6	83%Sioux 17% Pot.	12.40	8.60	12.80	11.60	11.45	17.80	74.65
4/4 + 3/4	20								57.02
1/2	6	100 % Sioux	16.33	9.33	10.66	12.00	9.00	15.33	72.64
1/4	5	100 % Sioux	12.80	11.23	13.60	13.20	10.60	17.20	78.63
1/4 + 1/2	11								75.63
0	6	White	17.33	9.16	7.80	10.00	13.00	12.33	74.64

* Age 18 indicates 18 years to 19 years. Only Indians who were exactly 4/4, 3/4, 1/2 and 1/4 Indian blood were used.
This table reads: Fourteen eighteen-year-old full blood Indians, 78% of whom were Navahoes and 31% of whom were Sioux, scored, on the average, 5.81 points at test 1, etc.

Table 15 shows that when the test scores for all eighteen year old Indians were pooled and were then grouped according to degree of Indian blood, tests 1, 2, 3 and 4 show an almost constant tendency for an increase in average score with decrease in percent of Indian blood. The remaining two tests showed this tendency to a lesser degree. The average of the total test scores made by the Indians of more than 1/2 Indian blood is less than that for the Indians of 1/2 or less Indian blood. It is also interesting to note that the five 1/4 blood Indians made an average total test score which was larger than that for the six eighteen-year-old whites.

Table 16

Average age and average score made by each blood group of 33 eleventh grade Sioux at each test.

	BLOOD			
	4/4	3/4	1/2	1/4
Number	6	7	15	5
Av. Age (years)	21.16	19.57	19.06	18.60
Test 1	13.33	14.00	13.93	14.20
Test 2	11.83	9.14	9.73	10.40
Test 3	14.00	11.54	12.33	12.80
Test 4	13.33	8.85	13.33	13.40
Test 5	10.16	9.14	9.33	11.80
Test 6	17.00	16.42	17.86	18.60
Total Test Score	79.66	69.14	76.66	81.20
Av.(4/4 + 3/4)(1/2+ 1/4)	74.40		78.93	

Table 16 shows that on the average the oldest eleventh grade Sioux are the full bloods, while the youngest are the 1/4 bloods. No constant relation is found between average score at each test and percent of Indian blood. The average of the total test scores made by the Sioux Indians of more than 1/2 and less Indian blood. It is just possible that the number of subjects in some of the blood groups was too small to show such tendencies as might exist in larger groups.

b. Results on tests for subjects of first and second grades.

The entire comparisons made between the two groups is summarized in the table below:

Table 17

First and second grade Potawatomi and Whites compared.

	Potawatomi	White
Number of Subjects	18	30
First Grade	9	13
Second Grade	9	17
Av. years in school	1.5	2 *
Average age (yrs.)	8.05	7.09
Range in ages (yrs)	7-12	6-9
Mean Score	5.50	5.01
Range in scores	0-12	0-13

* Approximately, including kindergarten.

From this table it may be seen that the whites were younger, and that they had been in school the longer of the two groups. The Potawatomi scored on the average .49 point higher than did the whites at the same questions.

The test results of the 18 Potawatomi subjects offer the following evidence concerning the effect of degree of Indian blood on score.

Table 18.

Degree of Indian blood and the score.

Indian Blood	Subjects	Mean Score
4/4	8	5.62
3/4	6	5.00
1/2 and 1/4	4	6.00
4/4 and 3/4	8 + 6	5.31

These data show that, in a general way, the average score for the Potawatomi subjects increased with decreased percent of Indian blood.

IV. INTERPRETATION OF RESULTS:

In the present section the writer will discuss (1) the relation of the language handicap of the American Indian to score in the individual tests of the test scales; and (2) the relation of the individual's familiarity with the situations presented in the tests to score.

The meager data on the Stanford-Binet tests would tend to indicate, if anything, that the language handicap of the American Indian is a very complex factor, which effects the individual tests in an irregular fashion, producing Indian inferiority in tests some of which seem, upon inspection, to be of a semi-verbal type and others of a distinctly verbal type. The test results on both the National intelligence test and the "Indian tests" furnish negative evidence for a probable effect of the language handicap upon verbal tests. The Indians showed their greatest superiority over the Whites in test 5, digit symbol, of the National scale. And they made their largest percent of the possible score in test 6, sign language, of the "Indian tests". These two tests are the most non-verbal in the two batteries of tests.

Although Rowe (23) reports no interpretation upon his results from 268 Indian and 547 White subjects at the 1911 edition of the Binet-Simon test, his data do tend to support the National intelligence test results of the present investigation. He found

that the "Indians are relatively weaker in tests involving comprehension and definition than in tests of a more purely perceptual or memory nature." (9)

Sample (65) reports "that probably among no other people has memory been more fully developed than in the home life of the Indian." (p.27) It may be then that this partly accounts for the Indians' relatively best performance in the digit-symbol and sign language tests, both of which seem to be of a memory nature.

It is impossible to say how much of the Indian inferiority in the three National tests,where Indian inferiority was shown, was due to their language handicap and how much was due to either their lack of familiarity with the situations presented or to other potential factors.

Garth (15) reports that the full blood Indians made lower scores than did the mixed bloods at the National intelligence test, Scale A. He interprets his data to mean that the greater language difficulty of the full bloods was the essential factor in preventing them from scoring as well as the mixed bloods. (p.89)

Hunter (18) reports that the full bloods' lower score on the Otis test "would seem to indicate a racial difference probably of intelligence." (p.277)

The National test results that are presented in this thesis furnish slight evidence that the alleged greater language

handicap of the full blood Indian is probably not so important a factor in producing low test score as is some other factor, probably an actual lack of intelligence. The greatest amount of White superiority was never with the full blood Indians in any one of the National intelligence tests. But the quintile of lowest total test scores did show the greatest amount of White superiority in three out of the five National tests. Although this quintile was composed of 65 % full bloods, yet full bloods were also found in all of the quintiles of higher total test scores. It would,then, seem likely that some factor other than the full bloods' alleged greatest language difficulty was the important factor in producing the Indians' lowest total test scores. The latter view is supported by the following evidence from the "Indian tests" results: The eighteen-year-old full bloods consistently made the lowest score in each of the tests including the non-verbal test, sign language. And in 63 % of all the age levels the full bloods in each tribal group made the lowest total test scores. It would seem reasonable to believe that at the upper age levels even the full bloods would not encounter any difficulty with the linguistics of the simple sentences in the four of the "Indian tests."

Colvin (7) concludes that "psychological tests are valid in showing differences in native mentality when and only when those tested have had common experiences and similiar interests." (p.9). This view seems to be generally conceded by testers. In the present study it has been shown that two of three tribal groups

tended to maintain superiority over the Whites at a simple form of verbal tests, which present situations that fit into the environment and experiences of the Indian. This tended to hold at all age levels from 7 years on up. And the "Indian tests" which were best suited to the respective tribal groups seemed to be least adapted to the Whites.

V. CONCLUSIONS:

The evidence on the Stanford-Binet scale is inadequate to permit the experimenter to say which of the tests were effected by the Indians' language handicap. Indian superiority was shown in some tests of a distinctly verbal type as well as in tests of a semi-verbal nature.

The Indians showed their greatest superiority over the Whites in test 5, digit-symbol, of the National intelligence test scale. This would tend to show that a language difficulty was probably a factor in producing their inferiority to Whites in three out of the four verbal tests of the scale.

It is possible that a part of the Indian inferiority at certain of the Individual tests of both the Stanford-Binet and the National test scales must be attributed to their lack of familiarity with the situations presented in some of the tests. The data

presented in section III B, 3 of this thesis tend to indicate both that it would be possible to devise tests which would be better adapted to the Indian than are either the Stanford-Binet or the National intelligence tests; and that it would be difficult to make tests which would fit both the Indians and whites equally well.

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VII. APPENDIX

Table A

SUMMARY OF TEST RESULTS - STANFORD-BINET TEST.
(Tested by Writer)

A --- Indian Subject
B --- White Subject

	C.A.	M.A.	I.Q.
*A. Luther Nawasusk	7	6	85
*B. Philip Overbaugh	7-2	6	83
*A. Evelyn Teeser	8	6-2	75
*B. Ester Williams	5-8	6-2	102
*A. Andrew Rice	8	6-6	81
*B. John Harrell	5-1	6-4	124
A. James Martin	9	6-10	75
B. Loretta Harrison	7-2	6-10	95
A. Micheal Keses	8-1	7-2	88
B. Clara Cole	7-9	7-4	94
A. Ernest Moresnow	10	7-10	78
B. Virginia Clark	6-7	7-8	116
A. Josephene Flack	16-3	8-2	51
B. Gladys Welfeldt	9-10	8	81
A. Mae Ellis	17-6	8-6	53
B. James Vauter	8-6	8-6	100
A. Eliza Wingate	14-7	8-10	60
B. Alberta Moody	9-3	8-10	95
A. Edgar Mack	11-3	8-11	79
B. Jimmie Preyer	7-6	8-10	95
A. John Ellis	12-7	9-6	75
B. Eugene Jackson	10	9-5	94
A. Eugene Sloan	12-1	9-7	79
B. Virginia Hosford	8-10	9-8	109

* These pairs are not included in summarized results of table 1 because of low M.A.

	C.A.	M.A.	I.Q.
A. Albert Switch	13-7	9-9	71
B. Ona Lee Burson	10-8	9-8	90
A. Rosalind Silas	16-8	9-10	61
B. Floyd Hixon	15-11	9-9	61
A. Raymond Walker	9-4	10	107
B. Agnes Barton	9-7	10-2	106
A. Carl White	14-4	10-6	73
B. John Logue	9-7	10-6	109
A. Irene Whitman	17-4	11	68
B. John Cardis	11-10	11	92
A. Lawrence Grinnell	15	11-1	73
B. Clarence Gauck	11-1	10-10	97
A. Margery Box	17-1	11-6	71
B. Belba St. Clair	13-3	11-6	86
A. Rosa Grinnell	12-4	11-9	94
B. Marchia Oldfield	9	11-6	127
A. Myrtle Maupin	14-7	11-9	80
B. Don Alexander	9-8	11-11	123
A. Emery Kensler	14-1	12-11	91
B. Mary Edgar	12-11	12-8	98

Table B

Correlation between constancy of Indian scores and Indian superiority (degree of) over the white subjects at each of the National intelligence tests.

Test	Mean Difference	Coeff.of Ind.Variability	R_1	R_2	Gains
I	+ 2.15	.447	3	4	1
II	+ 2.65	.417	5	3	
III	- 2.88	.268	2	1	
IV	+ 2.36	.662	4	5	1
V	- 4.10	.346	1	2	$\frac{1}{3\varepsilon g}$

Spearmans Footrule:

$$R = 1 - \frac{6 \varepsilon g}{n^2 - 1}$$

$$R = 1 - .75$$

$$R = .25 \pm .001$$

Pearson's $r = .41$

Table C

Correlation between constancy of white subjects' scores and white superiority over Indian subjects at each of the tests.

Test	Mean Differences	Coeff. of White superiority	R_1	R_2	Gains
I	+ 2.15	.366	3	4	1
II	+ 2.65	.323	1	1	
III	- 2.88	.343	4	2	
IV	+ 2.38	.495	2	5	3
V	- 4.10	.350	5	3	$4 \leq g$

Formula: $R = 1 - \frac{6 \leq g}{n^2 - 1}$

$R = 1 - 24/24 = 0$

$R = 0$

Pearson's $r = 0$

Table D

Distribution of blood groups within quintiles of total test scores.

QUINTILE	BLOOD GROUPS 1/4	1/2	3/4	4/4	Percent of 4/4 in quintile
1/5	4	17	9	14	31 %
2/5	6	5	8	25	56 %
3/5	6	11	8	19	43 %
4/5	2	9	7	26	59 %
5/5	6	6	3	29	65 %
Totals	24	48	35	113	51 % of Indians are 4/4.

54%

Table E

Range of total test scores in each quintile

QUINTILE	RANGE OF TOTAL SCORES	POINTS OF RANGE
1/5	136-110	26
2/5	109.9-99	10
3/5	98.9-90	8
4/5	89.9-76	13
5/5	75.9-32	43

34

Table F

GRADE DISTRIBUTION

GRADE	WHITE	SIOUX	POTAWATOMI	NAVAHO	TOTALS
1	13	0	9	0	22
2	17	0	9	0	26
3	14	0	9	0	23
4	29	0	9	0	38
5	25	0	8	2	35
6	28	0	3	6	37
7	9	7	6	6	28
8	12	7	4	7	30
9	0	12	2	6	20
10	19	11	4	0	34
11	11	33	4	3	51
12	10	11	0	3	24
Totals	187	81	67	33	368

Table G

AGE DISTRIBUTION

AGE	WHITE	SIOUX	POTAWATOMI	NAVAHO	TOTAL
6	12	0	1	0	13
7	13	0	7	0	20
8	15	0	10	0	25
9	25	0	6	0	31
10	20	0	5	0	25
11	22	0	5	0	27
12	17	0	6	0	23
13	14	0	7	0	21
14	8	5	4	0	17
15	11	3	2	2	18
16	12	10	3	0	25
17	12	11	0	11	34
18	6	19	3	11	39
19	0	10	7	6	23
20	0	9	0	3	12
21	0	15	0	0	15
Totals	187	81	67	33	368

H. THE TESTS USED FOR SECTION B OF THE EXPERIMENTAL WORK AND DIRECTIONS FOR EXAMINING.

Name .....Grade ..... Boy or Girl.....
First name Last name

Date of birth..... Age.....
Month Day Year Years Months

Race.....

Name of School.....

TEST 1

Draw a line under the right answer to each question. Do as many as you can.

Samples(Can cows eat?..... Yes No
(Do stones swim?..... Yes No

BEGIN HERE

1. Is your shadow longer at noon than in the morning?.... Yes No
2. Do bears have a furry coat?..... Yes No
3. Can you sometimes see the moon while the sun is shining?..... Yes No
4. Do some cows have horns?..... Yes No
5. Do owls have fangs?..... Yes No
6. Does a plow sometimes have handles?..... Yes No
7. Is the hub a part of a chair?..... Yes No
8. Does the pine tree shed its leaves in the winter time? Yes No
9. Does a butterfly have six wings?..... Yes No
10. Are the rattles of a rattle snake on its head? ..... Yes No
11. Is charcoal dug out of a mine?..... Yes No
12. Does moss usually grow on the east side of a tree?.... Yes No
13. Is a clan a kind of tree?..... Yes No
14. Does an arrow shot from a bow go faster than a bullet shot from a gun? ..... Yes No
15. Are cooking pans ever made of iron?..... Yes No
16. Is a cultivator a farm implement?..... Yes No
17. Was Montgomery Ward a president of the United States?. Yes No
18. Does a corn plant sometimes have three ears of corn on it?..... Yes No
19. Should the American flag be raised at sunset?..... Yes No

TEST 2

Here is another test like the one that you have just finished.

BEGIN HERE

1. Do stars ever fall?..... Yes No
2. Is the cornstalk hollow on the inside?..... Yes No
3. Does a potato have eyes?..... Yes No
4. Do tepees always have chimneys? ..... Yes No
5. Is the rattlesnake black in color?..... Yes No
6. Does the buffalo have horns?..... Yes No
7. Does a spider have eight legs?..... Yes No
8. Is the hawk bigger than the crow?..... Yes No
9. Is the sun dog a wild animal?..... Yes No
10. Does the soapweed have flowers?..... Yes No
11. Is a gourd sometimes made out of a squash?..... Yes No
12. Does the cottonwood tree bear nuts with hard shells?.... Yes No
13. Can a calf which is only a day old walk?..... Yes No
14. Do spiders grow in a cocoon?..... Yes No
15. Is a bit a part of a saddle?..... Yes No
16. Is land sometimes called a reservation?..... Yes No
17. Was Sacajawea a great inventor?..... Yes No
18. Is a papoose a kind of music?..... Yes No
19. Is a quiver used for carrying arrows?..... Yes No
20. Is the big dipper in the sky in the east?..... Yes No

TEST 3

In each sentence draw a line under the words that make the sentence true, as shown in the samples:

Samples(Horses eat mostly nuts <u>grass</u> fruits bread.
(The number of cents in a dime is 2 5 <u>10</u> 25.

BEGIN HERE

1. The number of stars in the big dipper in the sky is 5 12 7 9 ..1
2. The potato plant sometimes has thorns blossoms nuts 2
3. A ripe kernel of wheat is white green brown gray 3
4. A squaw is a woman tree farm implement bird 4
5. Coyotes eat straw rats owls chickens 5
6. Flint is a kind of bird rock pot made of clay tree 6
7. Some people can tell the age of a horse by looking at its teeth ears hoofs eyes 7
8. The Indian chiefs used to make their warbonnet of the feathers of the pigeon ostrich eagle owl 8
9. Pow wow is a kind of corn weapon song meeting 9
10. The clover plant looks most like the wheatplant alfalfa plant tomato plant squash plant 10
11. A lister is used to build a house cut hay plant corn cook food 11
12. Every medicine man can make pills sing perform an operation....12
13. The color of the flower on alfalfa plant is nearest yellow red blue brown 13
14. The leaves of the soapweed look much like the leaves of the corn plant potato plant squash plant alfalfa plant....14
15. Hiawatha was written by Cooper Longfellow Poe Whittier 15
16. A chant is a kind of bird soil weapon song 16
17. A dormitory is a building used mainly for sleeping fixing automobiles church services playing games 17

18. A kind of soap is sometimes made out of coal sugar sand plants 18

19. Trachoma is a kind of flower soil disease food 19

20. The American's Creed was officially adopted by the United States Congress in the year 1890 1924 1918 1900 20

TEST 4

This is another test like the one you have just finished.

BEGIN HERE

1. A teepee is a kind of animal flower house man 1

2. An animal that has no legs is the turtle coyote snake eagle ..2

3. A drum is played with mouth sticks fingers bow 3

4. Most spiders spin webs to catch birds fish snakes flies 4

5. The squash grows on a vine bush tree stalk 5

6. An animal that has five toes on each foot is the chicken eagle rabbit 6

7. The acorn is a nut that grows on the oak tree pine tree elm tree cottonwood tree 7

8. Wakantanka is the name of an inventor president artist great spirit 8

9. The owl does often live with the crow prairie dog rat cow 9

10. The tassel is a part of the squash plant corn plant alfalfa plant bean plant 10

11. Ripe wild cherries are red blue black yellow 11

12. The magpie is a kind of bird snake dog fruit 12

13. The tree that has the smoothest bark is the oak walnut pine box elder 13

14. John Deere is the brand of a tooth brush wagon automobile soap 14

15. Buck skin is the skin of a horse snake coyote deer 15

16. Dakota is the name of a country in Europe River in the United States Tribe of Indians Variety of corn 16

17. The tail of the muskrat is most like the tail of a dog mouse horse cat 17

18. The lasso is used to plant corn shoot rabbits catch cattle drive nails 18

19. The axle is a part of a chair axe bed wagon 19

20. The ripe buffalo berry is yellow red white black 20

21. The rattlesnake adds a new rattle once every year every time a rattle has been broken off every time it sheds its skin 21

22. The number of spokes on a wagon wheel is about 6 40 12 24 ..22

23. Pemmican is a kind of bird food plant house 23

Test 5

This is another test like the one that you have just finished.

BEGIN HERE

*1. The Indian weaves his blanket out of cotton hides wool bark 1

2. Mutton is meat from a beef hog buffalo sheep 2

3. An animal that sometimes has horns is the goat coyote rabbit burro 3

*4. The loom is used for carding wool sewing weaving spinning 4

*5. The red ant has a tail wings two legs 5

6. The burro looks most like the coyote horse rabbit deer 6

*7. Sage is a kind of rock fish animal plant 7

8. An animal with a painful bite is the red ant locust cricket ...8

9. A ruby is usually green white red blue 9

*10. A substance that can be melted is chalk silver flint leather.10

*11. The value of a Mexican dollar in United States money is about fifty cents one dollar two dollars twenty-five cents 11

*12. Turquoise is an animal stone weapon bird 12

13. A mesa is usually found on the mountain side in the ocean on a desert in a river 13

14. A spur is used for making fires cutting corn riding 14

*15. Arbuckle is a brand of flour tobacco plow implement 15

16. Germantown is a brand of gun wool tobacco implement 16

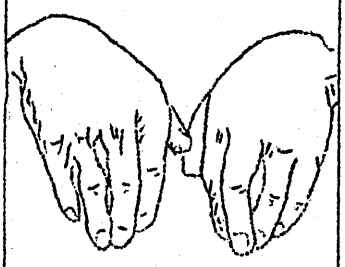
17. Cactus is a plant goat insect bird 17

*18. The corn plant usually has blue flowers bushy branches pollen short leaves 18

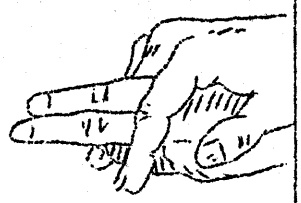
---

* 9 sentences selected as the most typically "Navaho".

TEST 6

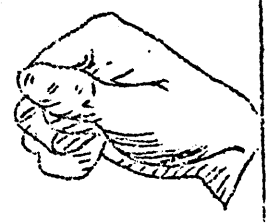


RAIN



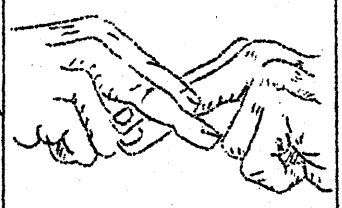
SADDLE

HORSE

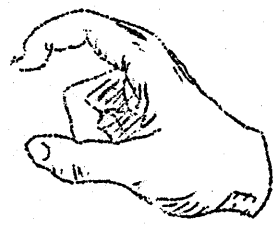


KILL

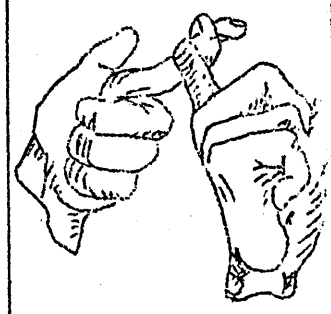
WIGWAM



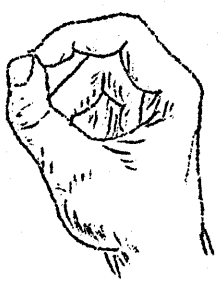
TRADE



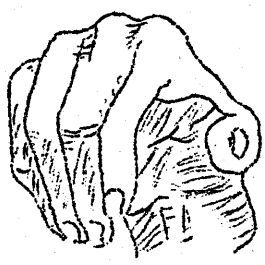
MOON



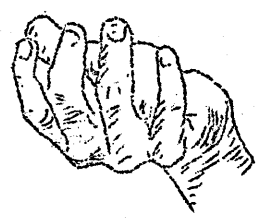
BROTHER



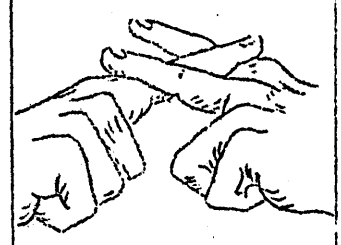
SUN



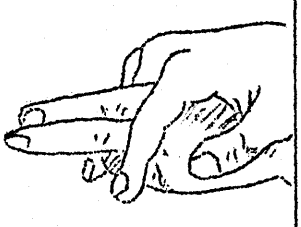
BEAR

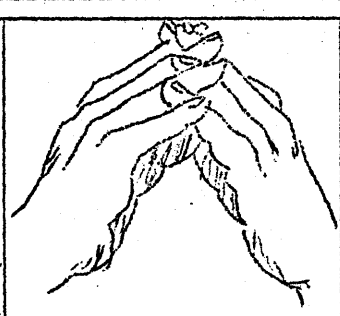


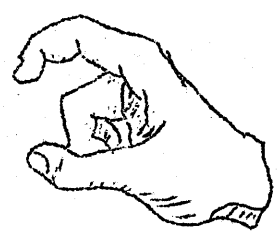
TREE

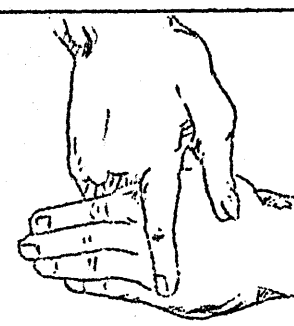


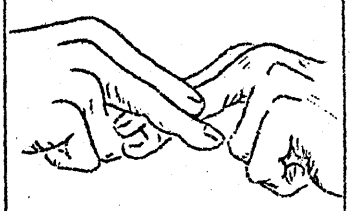
BUY

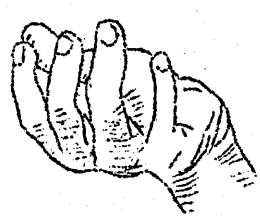


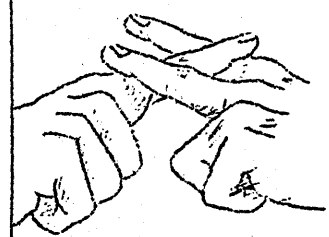


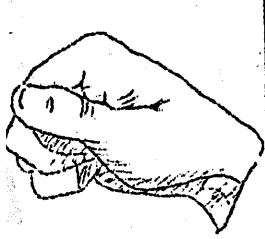


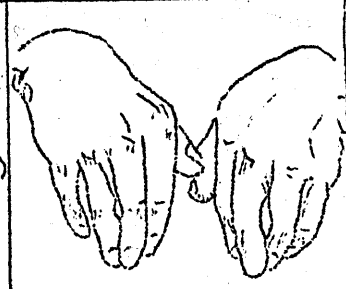


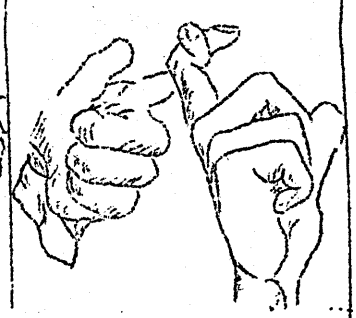


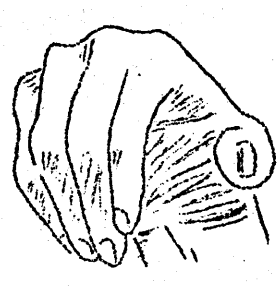




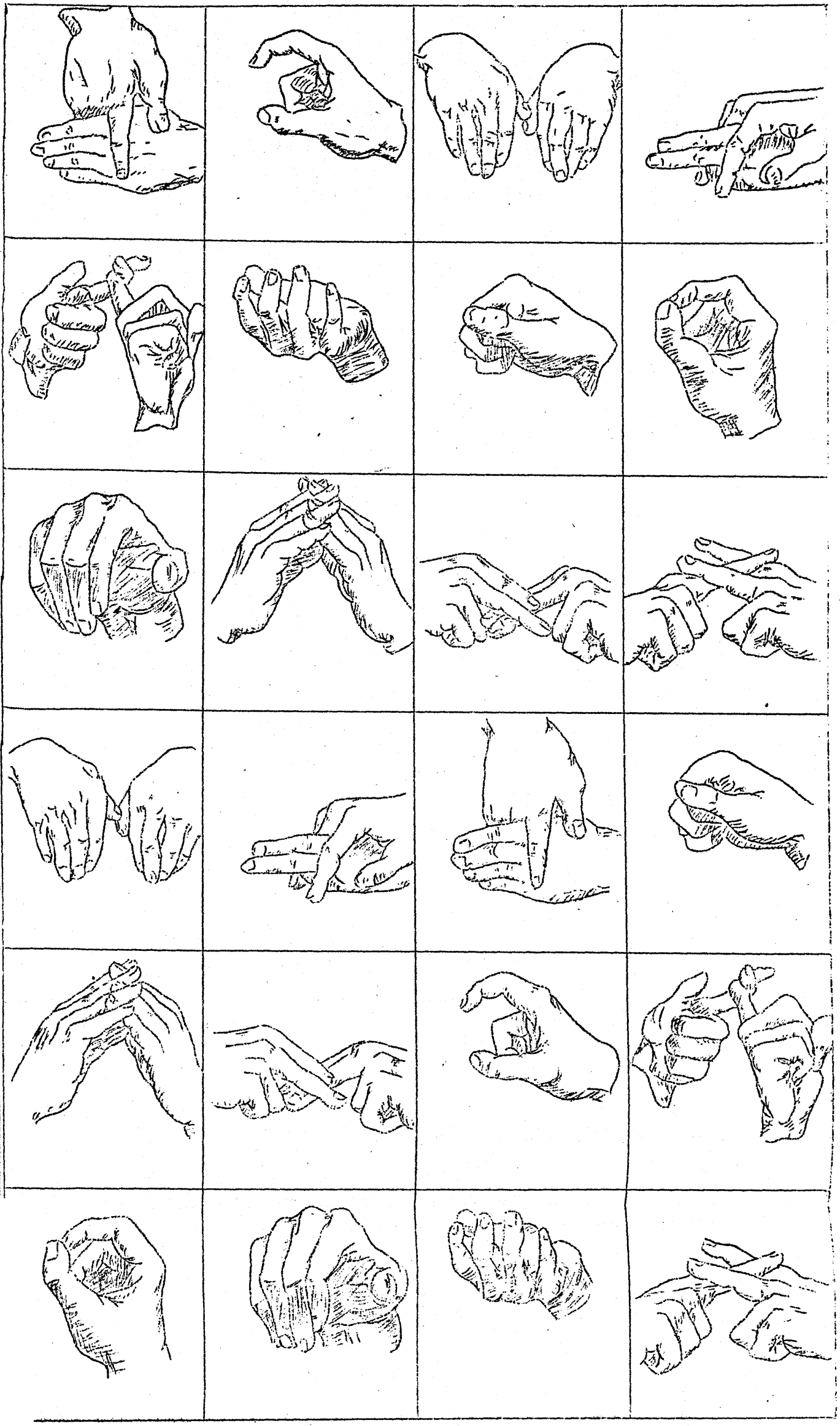








TEST 7



TEST FOR FIRST AND SECOND GRADES

POTAWATOMI AND WHITE CHILDREN

1. Do some cows have horns?
2. Is a drum played with the mouth?
3. Is a squaw a woman?
4. Does the big dipper in the sky have ten stars?
5. Does a potato have eyes?
6. Is your shadow longer at noon than in the morning?
7. Do coyotes sometimes eat owls?
8. Does the eagle have five toes on each foot?
9. Do stars ever fall?
10. Is a papoose a kind of song?
11. Does a plow sometimes have handles?
12. Does a butterfly have six wings?

A. Does a wigwam always have a chimney?

B. Is flint a kind of rock?

C. Does the squash grow on a vine?

D. Are the rattles of the rattlesnake on its head?

E. Does charcoal come from a mine?

F. Is the rattlesnake black in color?

G. Does the owl ever live in a hole in the ground?

H. Does a stalk of corn ever have more than one ear of corn on it?

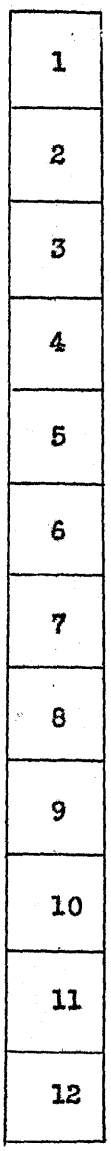
I. Does an arrow shot from a bow usually go faster than a bullet shot from a gun?

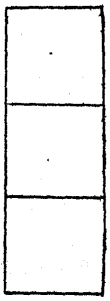
J. Does a buffalo ever have horns?

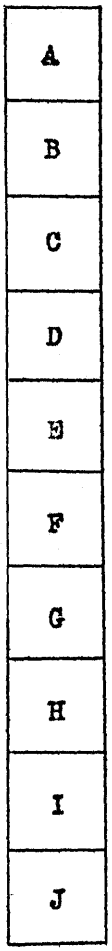
Subject's test blank - first and second grades.

What is your name?.....

How old are you? .....







DIRECTIONS FOR EXAMINING - ABOVE SECOND GRADE.

1. Preparations for Examination.

Make the usual necessary preparations for the group examination: (1) After every one is in, shut class room door to keep out possible distractions (2) Supply each subject with pencil and eraser (3) See that all desks are clear.

Say: A. To white subjects only.

" This is a test to find out what things boys and girls can do. You must do your very best, because we want to find out whether the boys and girls of the _____ School (Examiner names the school) can do as well as others. I think you will find this test very interesting."

B. To Indian subjects only.

"Most of the boys and girls here at Haskell have taken some of the tests that have been given out here. Those tests were made for the white boys and girls, and some people who have given many of the tests to the Indians believe that they are not entirely fair to the Indian. I have some tests here that I believe are fairer to the Indian boys and girls and we want to find out how well you can do them. You must all do your very best at them because I want to find out whether you boys and girls can do better at them than the other boys and girls of your grade. I think you will find the tests very interesting.

Continue:* "I am going to give each of you one of these books. Leave it on your desk until I tell you what to do." (E. has booklets distributed, taking care to see that they are not opened.)

"First write your name at the top of the page after the word Name. (Pause) After the word Grade write the number that tells what grade you are just about to finish. (Pause) After Boy or Girl, write the word that tells which you are. (Pause) On the next line, after Date of birth, write the month and the day of the month when you were born. Then at the end of the line, where it says Age, write the number that tells how old you are now. Write the years first and then the months. (Pause) On the next line, after the word Race, write the word that tells to what race you belong. (E. says, "White or Colored" if any of the latter are present. Or "Indian" when testing Indians.) (Pause) On the next line, after the word School, write ---------- (E. names the school.) (Pause) When you have finished that, please, raise your pencil so that I can see that you have finished.

"Now do just what I tell you to do. Never turn a page unless I tell you to. Never begin until I say 'Go'; that will be the signal. The Very Second I say 'Stop', you must stop and hold up your pencil. I shall watch to see how quickly you can do it. After we have begun you must not ask questions.

* From this point on the instructions are the same for both Indian and White subjects.

"Turn to test 1 on the next page. Be sure to turn just one leaf. It says test 1 at the top of the page."

II. Directions for Tests.

(After leaf has been turned) "Pencil up! Look at the first sample at the top of the page: Can cows eat? What is the right answer? (Pause) Yes, is the right answer so you see there is a line under the word Yes. Read the next question: Do stones swim? What is the right answer? (Pause) No is the right answer, so you see there is a line under the word No.

When I say 'Go' do the others on this page yourself. If you come to one that you cannot do, leave it and go on to the next one. Do as many as you can. Remember, read each question and draw a line under the right answer. Ready - Go."

After 2 minutes and 3 seconds say, "Stop! Pencils up. Next there will be some more questions of the same kind. When I say Over, you are to turn the page to test 2, just one leaf, and when I say Go, do as many as you can. Over! Look at the top of the page to see that it says test 2.

Test 2

"Remember, read each question and draw a line under the right answer. If you come to one that you cannot do leave it and go on to the next one. Ready - Go.

After 1 minute and 55 seconds say, "Stop! Pencils up. Look at test 3 on the next page."

Test 3

"Look at the first sample at the top of the page: Horses eat mostly nuts grass fruits bread. Which is the right word? (Pause). Grass is the right word. Horses eat mostly grass. So you see that the word grass has a line under it. Read the next sentence: The number of cents in a dime is 2 5 10 25. Which is the right number? (Pause) Ten is the right number. The number of cents in a dime is ten. So you see the number ten has a line under it.

"When I say 'Go' do the others on this page yourself. Remember, in each sentence draw a line under the word that makes the sentence true. If you come to one that you cannot do, leave it and go on to the next one. Do just as many as you can. Ready - Go!"

After 3 minutes and 3 seconds say , "Stop! Pencils up. Next there will be some more of the same kind. When I say Over, you are to turn the page to test 4, just one leaf, and when I say 'Go' do just as many as you can. Over. Look at the top of the page to see that it says test 4.

Test 4

"Remember, in each sentence draw a line under the words which make the sentence true. If you come to one that you

cannot do, leave it and go on to the next one. Do just as many as you can. Ready - Go!"

After 3 minutes and 35 seconds say, "Stop! Pencils up. Next there will be still more of the same kind. When I say Over, you are to turn the page to test 5 - just one leaf - and when I say Go, do as many as you can. Over. Look at the top of the page to see that it says test 5.

Test 5

"Remember in each sentence draw a line under the words that make the sentence true. If you come to one that you cannot do, leave it and go on to the next one. Ready - Go!"

After 2 minutes and 30 seconds say, "Stop! Pencils up. Now turn the page to test 6. See that it says test 6 at the top of the page."

Test 6

"Here are some signs that are used by some Indians in their sign language. You see that they use their hands in this sign language. Look at the first picture at the top of the page. That picture means Rain. Now look at the first picture at the lower one-half of the page, just below the two heavy black lines. Find out what that picture means. (Pause) What does it mean? Yes, that picture means Saddle. Now write the word Saddle beneath that picture,

then hold up your pencil, for we are not going to do the rest on this page now. (Pause) I am going to five you about one minute to study the pictures at the top half of this page. Look at each picture carefully and see what it means. Ready - Study."

After 50 seconds say, "Stop! Look up. Now turn to the next page of pictures - you must turn two pages to test 7. See that it says test 7 at the top of the page."

Test 7

"When I say Go, write the meaning of each picture in the right place. If you come to one that you cannot do, leave it and go on to the next one. Do just as many as you can. Ready - Go!"

After 2 minutes and 8 seconds say, "Stop! Pencils up. Now close your booklets and turn them over so that the first page is on top. Please pass your booklets to the front."

DIRECTIONS FOR EXAMINING - FIRST AND SECOND GRADES.

After the usual preliminary preparations for a group examination, E. says:

"I am going to ask you some questions. You must do your very best on them because I want to find out whether the boys and girls in the First and Second grades in the _____ School can do as well as others. I think you will find this test great fun.

"Now I am going to give each one of you one of these pages. Please do not write on it until I tell you what to do.(E. distributes the test blanks of the form shown on page 104.)

"Now read the first question at the top of the page: What is your name? Write your first name and then your last name one the line after that question. (Pause) Read the next question - How old are you? Write the number that tells how many years old you are now. (Pause) Do you see the three squares at the top of the page? Put the pointing finger of your left hand (E illustrates.) into the top one of those three squares. (E sees that this is done, and that any pupils who write with their left hand, point with their right-hand finger.) Keep your finger in the square until I say that you may take it out. Now I am going to ask you a question and if you think Yes is the right answer, then make a mark like this (E writes + on the black board) in the square where you finger

is now.(x) But if you think that No is the right answer then make a mark like this in that square. (E. writes - on the black board.) And if you don't know the right answer to the question then don't write anything in that square. (y) Remember, if you think that Yes is the right answer to the question then make a mark like this (E points to +) in that square. If - etc. (E. repeats from x to y above.)

E. sees that everyone's finger is in the right square then continues:

"Now listen carefully. Do birds fly? (E repeats question) What is the right answer? (Pause) Yes is the right answer so you make a mark like this in the square in which your finger is now. (E points to +. Pause) Now put your finger in the next square and then look up. Ready! Do Stones swim? (E. repeats the question.) What is the right answer? No is the right answer, so you put a mark like this (E points to -) in the square where your finger is now. (Pause) Now put your finger in the last one of the three squares and then look up. Ready! Does a dog have four feet? (E repeats question) You answer this question by your self. (Pause) Now put your finger in the top square at the left of the page that has the number 1 in it. I am going to ask you some more questions and you must answer these questions by yourself. (Pause until everyone is ready.) Ready! Do some cows have horns?" (E repeats, then pause.) Continue in same manner until all 22 questions have been given.